

ZEXEL - T E S T   V A L U E S  
Injection pumps

|                  |   |                   |     |
|------------------|---|-------------------|-----|
| <u>BOSCH No.</u> | : | 9 400 610 152     | 1/4 |
| <u>ZEXEL No.</u> | : | 101603-6470       |     |
| <u>Date</u>      | : | 30.05.1991        | [0] |
| <u>Company</u>   | : | MITSUBISHI        |     |
| <u>Engine</u>    | : | 6D14CT / ME070091 |     |

IP-Type number : 101060-9720 / PES6A  
Governor type number : 105410-8040 / EP/RSV

T E S T   P R E R E Q U I S I T E S

Test oil : ISO-4113  
Test oil inlet temperature °C : 40.00...45.00  
Inlet pressure bar : 1.6  
Test nozzle holder combination : 1 688 901 013  
Opening pressure bar : 175  
Test pressure line  
Inner x Outer Dia - Length mm : 2.00 x 6.00 x 600

P O R T   C L O S I N G

Prestroke mm : 3.3 ± 0.05  
Rod position mm : -  
Port closing mark Cyl. No. : -  
Cam sequence : 1-5-3-6-2-4

Port closing mark Cyl. No. : -  
Port closing difference °NW : 0-60-120-180-240-300

Tolerance +- °C: 0.50 (0.75)

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ZEXEL - Test values  
Injection pumps



## Injection Quantity :

| Adjusting Point | Rack Position (mm) | Pump Speed (r.p.m) | Injection Q'ty (cc/1000 str.) | Difference (%) | Fixed | Remarks |
|-----------------|--------------------|--------------------|-------------------------------|----------------|-------|---------|
| A               | 10.0               | 700                | 79.3 - 81.3                   | ± 2.5          | Rack  | Basic   |
| H               | approx. 7.6        | 375                | 8.2 - 11.2                    | ± 15.0         | Rack  |         |
| A               | 10.0               | 700                | 79.3 - 81.3                   | -              | Lever | Basic   |
|                 |                    |                    |                               |                |       |         |
|                 |                    |                    |                               |                |       |         |

Timing Advance Specification : EP/SBZ  
105624-5180

|                      |           |         |  |  |  |  |  |
|----------------------|-----------|---------|--|--|--|--|--|
| Pump Speed (r.p.m)   | 600       | 900     |  |  |  |  |  |
| Advance Angle (deg.) | Below 0.5 | 1.5-2.5 |  |  |  |  |  |



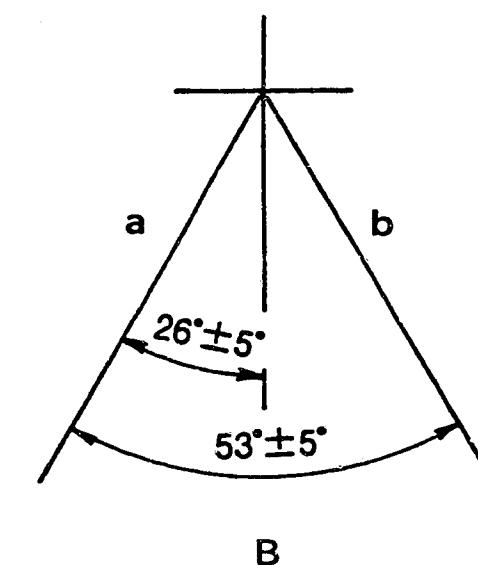
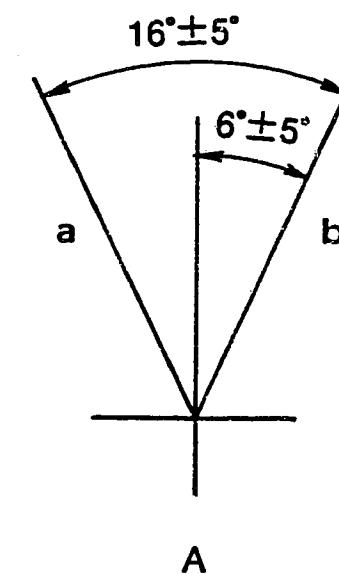
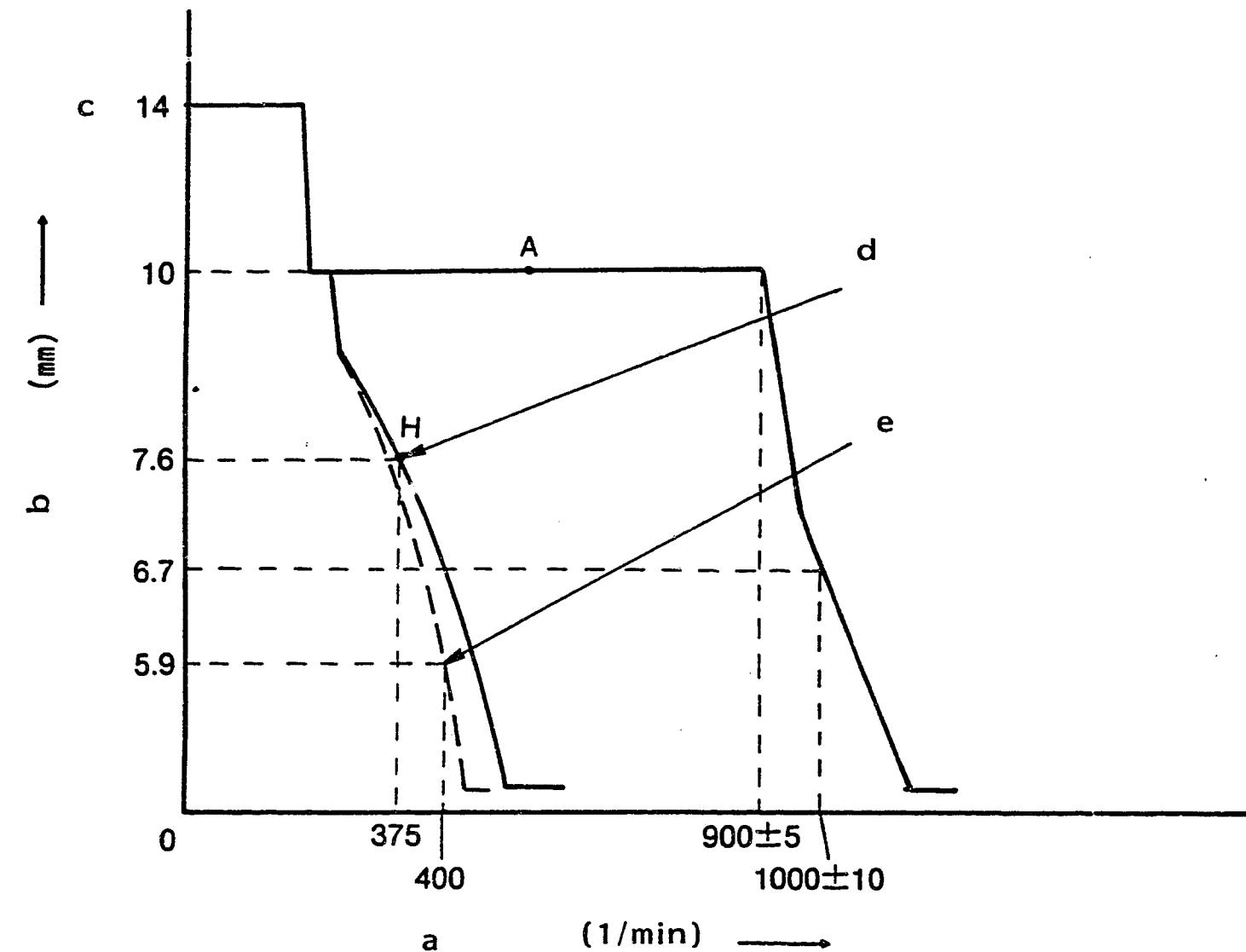


Figure 1

a = Pump speed  
 b = Control rack position  
 c = above  
 d = Idle-sub spring setting  
 e = Governor spring setting

■ Note

- Before adjustment, remove the idling sub spring and the torque control spring.
- Move the control lever fully in the stop direction, and set the minimum-speed stopper bolt so that the control rack position is 0.5 - 1.0 mm.

GOVERNOR ADJUSTMENT

Recommended speed droop adjustment screw position: 10

A = Speed control lever angle

B = Stop lever angle

a = Idling

a = Normal

b = Full-speed

b = Stop

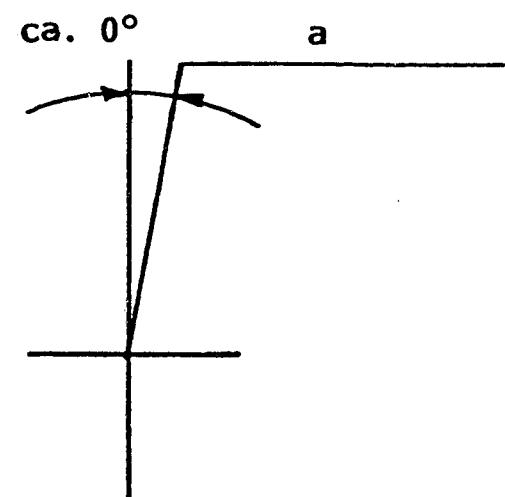
101603-6470 2/4

|                                     | Pump Speed<br>(rpm)   | Rack Position<br>(mm) | Remarks   |
|-------------------------------------|---|-----------------------|---|
| Full-load Adjustment<br>(Temporary) | 895 - 905   | 10.0                  | • Adjust using screw (1)  |
| Full-load Adjustment                | 900   | 10.0                  | • Adjust using screw (2)  |
| Maximum-speed<br>Adjustment         | 895 - 905<br>990 - 1010   | 10.0<br>6.7           | • Adjust using screw (1)<br>• Adjust using spring<br>capsule (5)                        |
| Idling Adjustment                   | 400<br>375<br>-   | 5.9<br>7.6<br>-       | • Fix the control lever<br>• Adjust using idling-sub<br>spring capsule (5)<br>• Confirm |
| Control Lever Angle<br>Measurement  | <ul style="list-style-type: none"> <li>Measure the control lever angle at the "idling" and "full" positions.</li> <li>When the control lever is depressed toward the "full" position, replace the shifter's shim with a thicker one.</li> <li>When the control lever is depressed toward the "idling" position, replace the shifter's shim with a thinner one.</li> </ul> |                       |   |

## ■ TIMING SETTING

At No. 1 plunger's beginning of injection position  
B.T.D.C.: 16°

Figure 2  
a = Pump center line



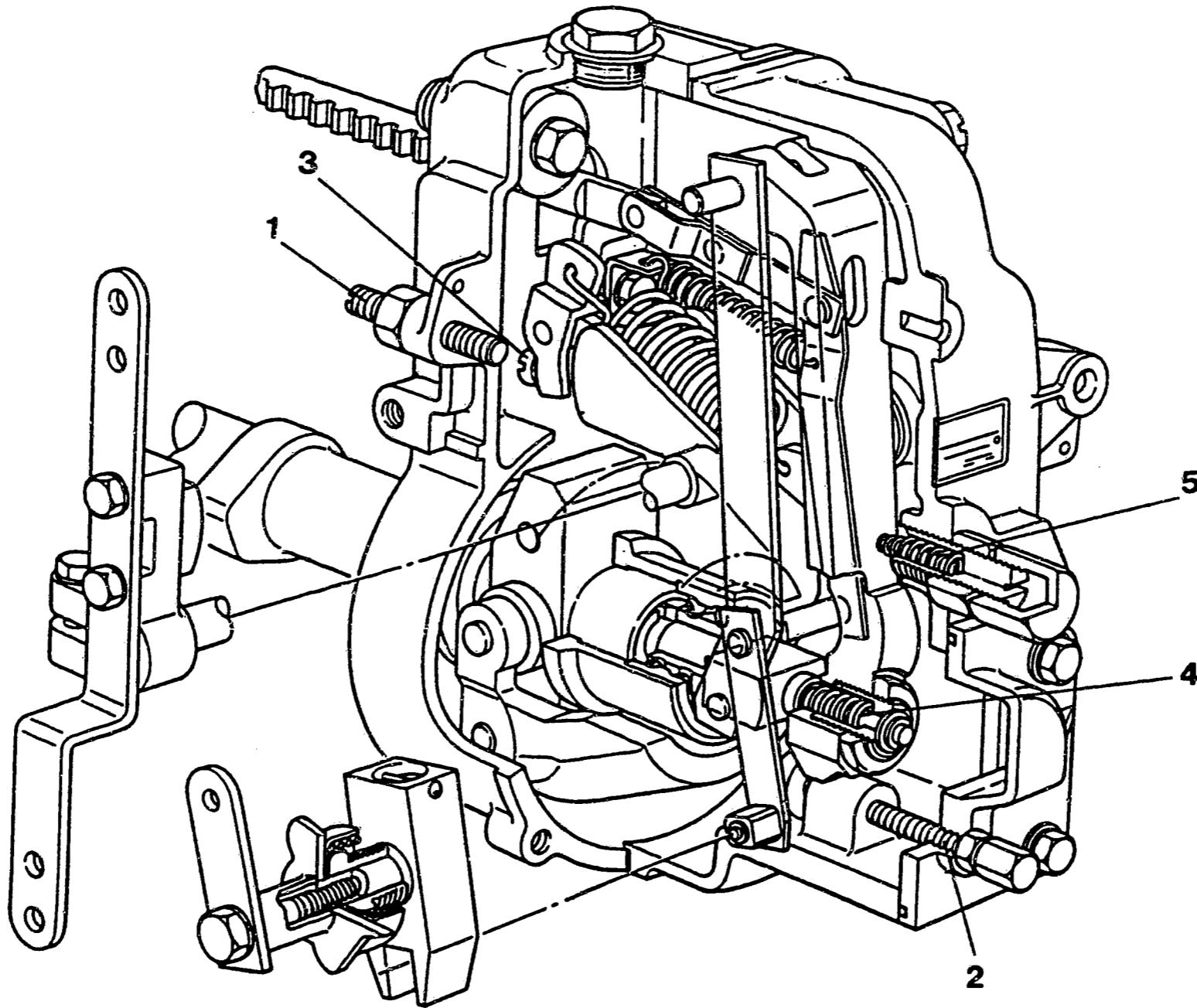


Figure 3

- 1 = Screw
- 2 = Screw
- 3 = Screw
- 4 = Spring capsule
- 5 = Spring capsule

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ZEXEL - Test values  
Injection pumps



A9

ZEXEL - Test values  
Injection pumps



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL-TEST VALUES  
Distributors pumps  
Engine model: NEW HA

|           |                |
|-----------|----------------|
| BOSCH No. | 9 460 610 474  |
| ZEXEL No. | 104740-0123    |
| Date:     | 30.05.1991 [0] |
| Company:  | MAZDA          |
| No.       | SE0913800A     |

Injection pump no. 104640-0123

(NP-VE4/10F1900RNP57)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:

1 688 901 000

Test pressure line:

1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------|----------------------------|----------------|---------------------------------|-----------------------------------|-----------------|
| 1-1               | Timing device travel       | 1500           | 5.0 - 5.4 (mm)                  |                                   |                 |
| 1-2               | Supply pump pressure       | 1500           | 5.7 - 6.3 (kg/cm <sup>2</sup> ) |                                   |                 |
| 1-3               | Full load delivery         | 1000           | 53.1 - 54.1 (cc/1000st)         |                                   | 3.5             |
|                   | Full load delivery         |                | (cc/1000st)                     |                                   |                 |
| 1-4               | Idle speed regulation      | 350            | 10.8 - 14.8 (cc/1000st)         |                                   | 2.5             |
| 1-5               | Start                      | 100            | above 78.0 (cc/1000st)          |                                   |                 |
| 1-6               | Full-load speed regulation | 2100           | 19.1 - 25.1 (cc/1000st)         |                                   |                 |
| 1-7               |                            |                |                                 |                                   | 5.5             |

## 2. Test values

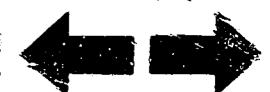
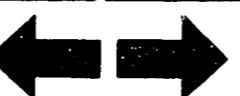
|                       |                               |                     |                   |                   |  |
|-----------------------|-------------------------------|---------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 1000<br>1.6 - 2.8   | 1500<br>4.9 - 5.5 | 1900<br>7.0 - 8.2 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 500<br>2.3 - 2.9    | 1500<br>5.7 - 6.3 | 1900<br>7.1 - 7.7 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 1000<br>53.0 - 97.0 |                   |                   |  |

## 2-4 Fuel injection quantities

| Control lever position | Speed<br>rpm                                      | Fuel delivery<br>(cc/1000 strokes) | Charge-air<br>pres(mmHg) | Difference (cc) |  |
|------------------------|---|------------------------------------|--------------------------|-----------------|--|
| End stop               | 1000  | 52.6 - 54.6                        |                          |                 |  |
|                        | 500   | 45.6 - 49.6                        |                          |                 |  |
|                        | 1500  | 50.3 - 54.3                        |                          |                 |  |
|                        | 1900  | 46.4 - 50.4                        |                          |                 |  |
|                        | 2100  | 19.1 - 25.1                        |                          |                 |  |
|                        | 2200  | below 6.0                          |                          |                 |  |
| Switch off             | 350   | 0                                  |                          |                 |  |
| Idle<br>stop           | 350<br>below 620                                  | 10.8 - 14.8<br>0                   |                          |                 |  |
| 2-5<br>Solenoid        | Cut-in voltage max.: 8V<br>Test voltage: 12 - 14V |                                    |                          |                 |  |

## 3. Dimensions

|                     |                 |
|---------------------|-----------------|
| K                   | 3.2 - 3.4 mm    |
| KF                  | 5.7 - 5.9 mm    |
| MS                  | 1.7 - 1.9 mm    |
| BCS                 | - mm            |
| Pre-str.            | 0.18 - 0.22 mm  |
| Control lever angle |                 |
| α                   | 18.0 - 22.0 deg |
| A                   | 35.9 - 38.6 mm  |
| β                   | 33.0 - 43.0 deg |
| B                   | 10.2 - 13.9 mm  |
| γ                   | - deg           |
| C                   | - mm            |



Test oil:  
ISO 4113 or  
SAE J967d

**ZEXEL-TEST VALUES**  
Distributors pumps  
Engine model: CD20

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BOSCH No. 9 460 610 478  
ZEXEL No. 104740-2184  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 1670057J00

Injection pump no. 104640-2184

(NP-VE4/10F2500LNP865)

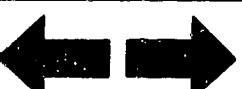
Pump rotation.: Counter clockwise-viewed  
from drive side

Test-nozzle holder combination:  
1 688 901 022

Test pressure line:  
1 680 750 073

| 1. Setting values      |   | Speed<br>(rpm)  | Setting values                                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|------------------------|---|---|---|-----------------------------------|-----------------|
| 1-1                    | Timing device travel                                | 1000  | 2.5 - 2.9 (mm)                                  |                                   |                 |
| 1-2                    | Supply pump pressure                                | 1000  | 3.9 - 4.5 (kg/cm <sup>2</sup> )                 |                                   |                 |
| 1-3                    | Full load delivery                                  | 1400  | 36.7 - 37.7 (cc/1000st)                         |                                   | 3.0             |
|                        | Full load delivery                                  |   | (cc/1000st)                                     |                                   |                 |
| 1-4                    | Idle speed regulation                               | 350   | 9.5 - 11.5 (cc/1000st)                          |                                   | 2.0             |
| 1-5                    | Start   | 100   | 50.0 - 70.0 (cc/1000st)                         |                                   |                 |
| 1-6                    | Full-load speed regulation                          | 2700  | 12.0 - 16.0 (cc/1000st)                         |                                   | 4.5             |
| 1-7                    |   |   |   |                                   |                 |
| 2. Test values         |   |   |   |                                   |                 |
| 2-1                    | Timing device                                       | N = rpm<br>mm   | 1000 1800 2400<br>2.4 - 3.0 5.8 - 7.0 8.0 - 9.0 |                                   |                 |
| 2-2                    | Supply pump   | N = rpm<br>kg/cm <sup>2</sup>   | 1000 1800 2400<br>3.9 - 4.5 5.6 - 6.4 7.1 - 7.9 |                                   |                 |
| 2-3                    | Overflow delivery                                   | N = rpm<br>cc/10s   | 1000<br>43.0 - 97.0                             |                                   |                 |
| 2-4                    | Fuel injection quantities                           |   |   |                                   |                 |
| Control lever position | Speed<br>rpm  | Fuel delivery<br>(cc/1000 strokes)  | Charge-air<br>pres(mmHg)                        | Difference (cc)                   |                 |
| End stop               | 1400<br>600<br>1000<br>1800<br>2400<br>2700<br>2800 | 36.2 - 38.2<br>29.8 - 34.8<br>31.3 - 36.3<br>36.1 - 40.1<br>34.7 - 39.7<br>11.5 - 16.5<br>below 5.0 |   |                                   |                 |
| Switch off             | 350   | 0   |   |                                   |                 |
| Idle<br>stop           | 700<br>350  | below 5.0<br>9.5 - 11.5   |   |                                   |                 |
| Partial load           | 700   | 12.0 - 24.0   |   |                                   |                 |
| 2-5<br>Solenoid        |   | Cut-in voltage max.: 8V<br>Test voltage: 12 - 14V   |   |                                   |                 |

| 3. Dimensions       |                   |
|---------------------|-------------------|
| K                   | 3.2 - 3.4 mm      |
| KF                  | 6.68 - 6.88 mm    |
| MS                  | 0.7 - 0.9 mm      |
| BCS                 | - mm              |
| Pre-str.            | - mm              |
| Control lever angle |                   |
| α                   | 23° - 27° deg     |
| A                   | 14.1 - 19.4 mm    |
| β                   | 39° - 49° deg     |
| B                   | 12.2 - 15.7 mm    |
| γ                   | 10.5° - 11.5° deg |
| C                   | 6.8 - 7.4 mm      |



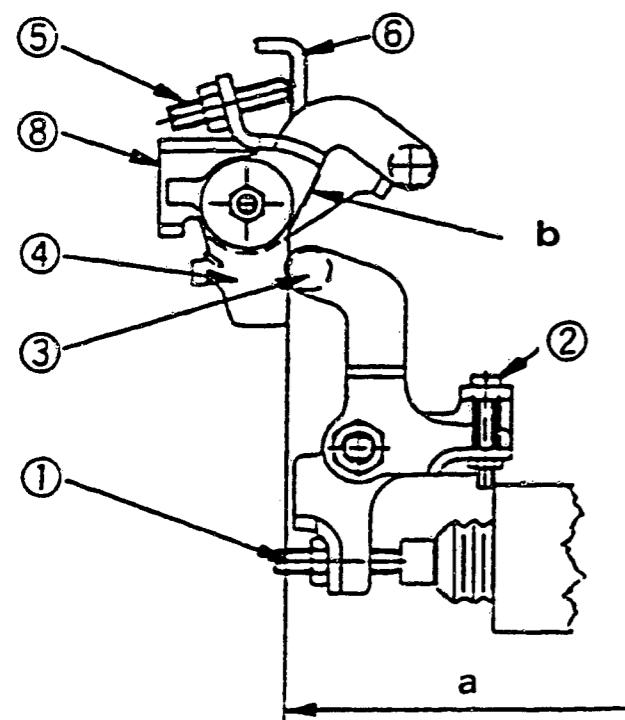


Figure 4

a = Vertical position  
b = Aligning mark

■ W-CSD ADJUSTMENT

1. Timer Stroke Adjustment (adjust to the thick line)

- 1) Calculate the timer stroke from Fig. 5 according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the timer stroke adjusting screw so that the timer stroke is as calculated in Fig. 5 (diagram).

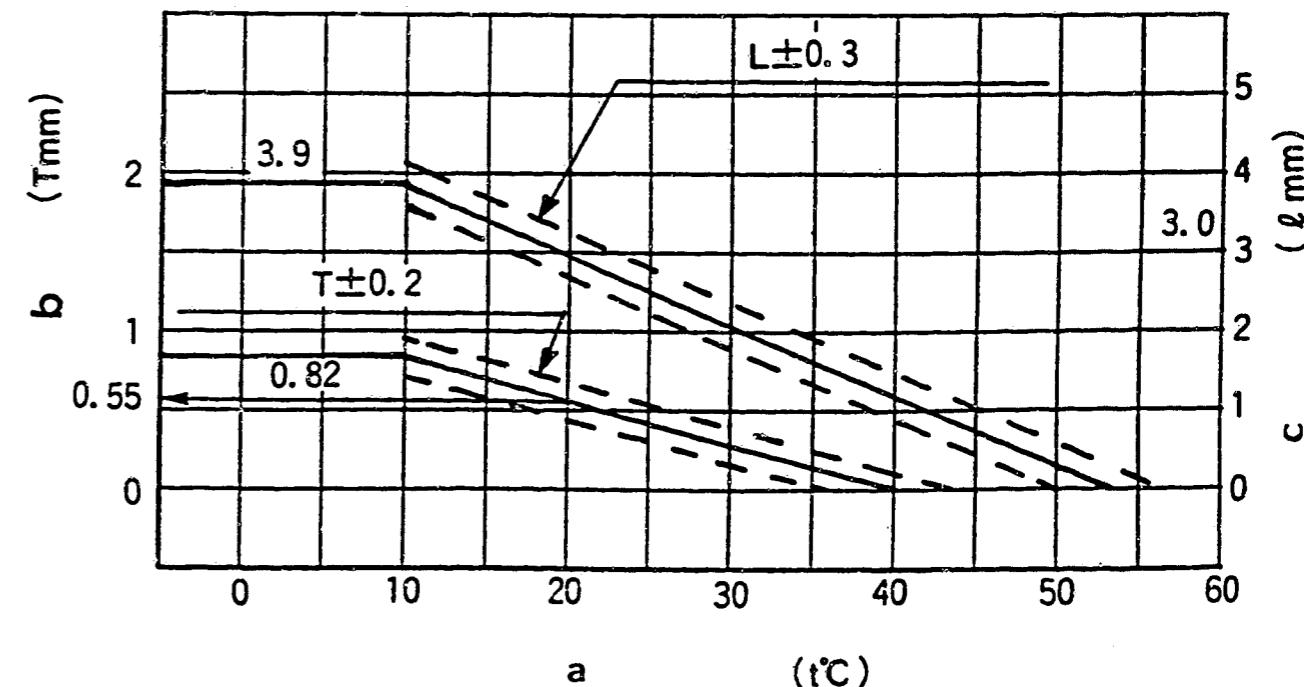
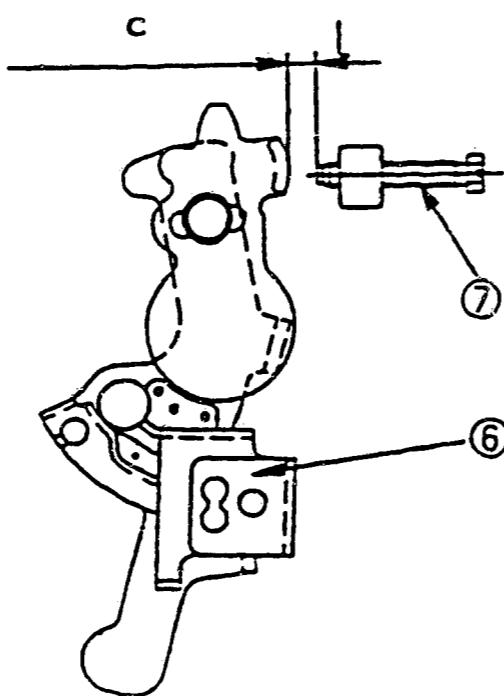


Figure 5

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a = Atmospheric temperature  
b = Timer stroke  
c = Gap between control lever and  
idling stopper bolt

(Continued)

## 2. Intermediate Lever Position Adjustment

- 1) Insert a block gauge (thickness gauge) of  $3.0 \pm 0.05$  mm thickness between the control lever and the idling stopper bolt.
- 2) Insert a block gauge (thickness gauge) of  $5.3 \pm 0.05$  mm thickness between the intermediate lever and the intermediate lever bracket.
- 3) Align the intermediate lever with the aligning mark.
- 4) Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.



## 3. CSD Lever Adjustment (adjust to the thick line)

- 1) Calculate the block gauge dimension  $l \pm 0.05$  mm from (Fig. 5) according to the atmospheric temperature at the time of adjustment.
- 2) Insert the block gauge (thickness gauge) between the control lever and the idling stopper bolt.
- 3) Using the idling bolt, adjust so that the CSD lever roller and the intermediate lever are in contact.

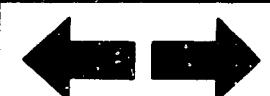
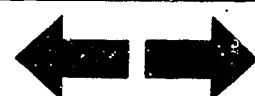
## 4. Final Adjustment

After completing the adjustment, screw the timer stroke adjusting screw two turns clockwise.  
(Move from the temporary adjustment chart to the final adjustment chart).

**Note:**

1. The temperature of the wax must be below 30°C when adjusting.
2. When inserting a block gauge (thickness gauge) between the control lever (bracket) and the idling stopper bolt, use the idling adjusting bolt to separate the CSD lever and the intermediate lever so that no excessive force is exerted on them.

|                                 |                             |                                   |                            |
|---------------------------------|-----------------------------|-----------------------------------|----------------------------|
| $\theta$ (°C) $\leq 10$         | $TA = 0.82$                 | $\theta$ (°C) $\leq 10$           | $L = 3.9$                  |
| $10 \leq \theta$ (°C) $\leq 20$ | $TA = -0.027 \theta + 1.09$ | $10 \leq \theta$ (°C) $\leq 30$   | $L = -0.09 \theta + 4.8$   |
| $20 \leq \theta$ (°C) $\leq 40$ | $TA = -0.0275 \theta + 1.1$ | $30 \leq \theta$ (°C) $\leq 54.3$ | $L = -0.086 \theta + 4.68$ |



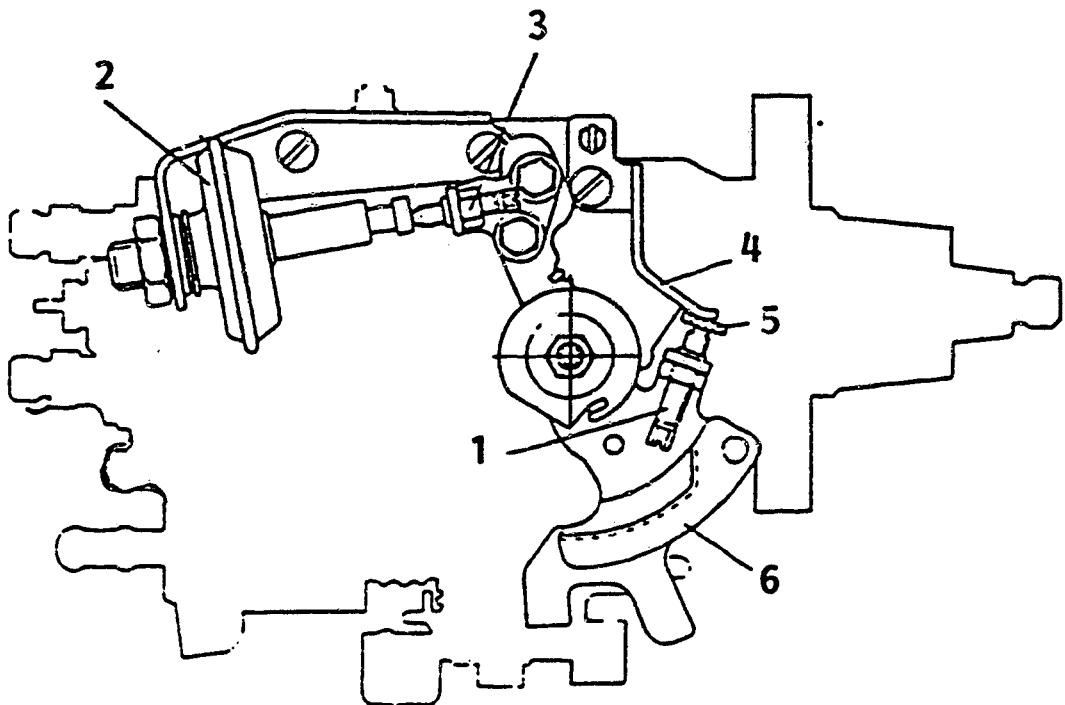


Figure 6

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- 1 = Idling stopper bolt
- 2 = Dashpot
- 3 = Dashpot adjusting screw
- 4 = Bracket
- 5 = Block gauge
- 6 = Control lever

#### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $6.0 \pm 0,05$  mm in the gap between the bracket and the idling stopper bolt.

(Continued)

2. With the control lever positioned as described in point 1., adjust the dashpot adjusting screw so that the dashpot adjusting screw and the push rod are in contact.

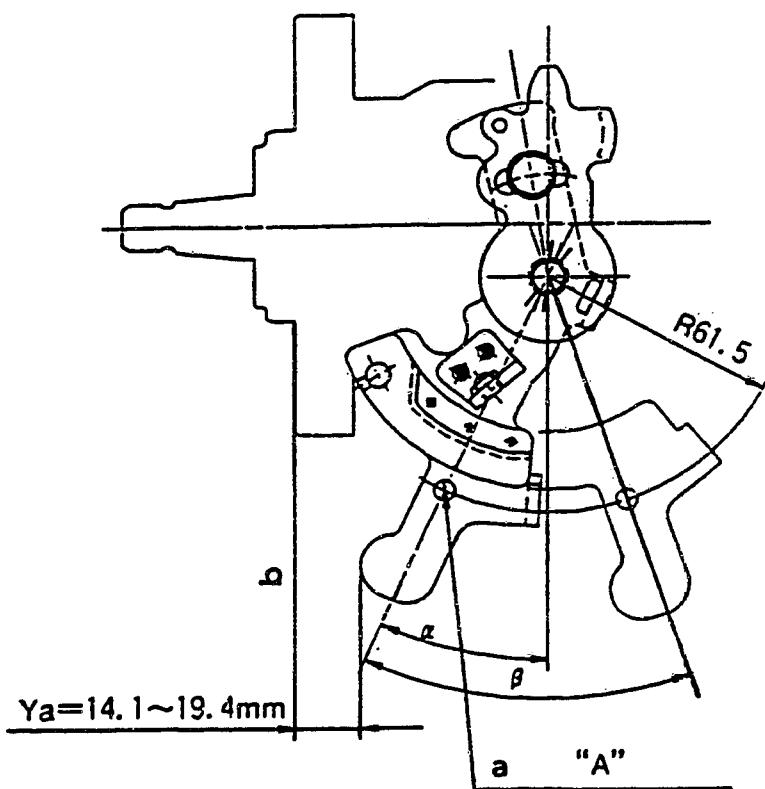
Fix the screw using the nut.

3. Adjust the dash pot mounting position so that the dash pot of the tip and the control lever are in contact. Fix the dash pot using the nut.

**Caution:**

- The adjusting screw and the pushrod must move together smoothly.
- Confirm that the control lever returns to the idling position.





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(Continued)

Figure 7

a = Measurement position  
b = End face of flange

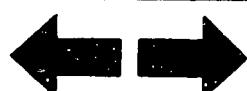
■ CONTROL LEVER ANGLE MEASUREMENT POSITION

- 1) Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole "A".

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ZEXEL - Test values

Injection pumps



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL-TEST VALUES  
Distributors pumps  
Engine model: CD20

1/4

BOSCH No. 9 460 610 479  
ZEXEL No. 104740-2194  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 1670057J05

Injection pump no. 104640-2191

(NP-VE4/10F2500LNP865)

Pump rotation.: Counter clockwise-viewed  
from drive side

Test-nozzle holder combination:  
1 688 901 022

Test pressure line:  
1 680 750 073

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------|----------------------------|----------------|---------------------------------|-----------------------------------|-----------------|
| 1-1               | Timing device travel       | 1000           | 2.5 - 2.9 (mm)                  |                                   |                 |
| 1-2               | Supply pump pressure       | 1000           | 3.9 - 4.5 (kg/cm <sup>2</sup> ) |                                   |                 |
| 1-3               | Full load delivery         | 1400           | 36.7 - 37.7 (cc/1000st)         |                                   | 3.0             |
|                   | Full load delivery         |                | (cc/1000st)                     |                                   |                 |
| 1-4               | Idle speed regulation      | 350            | 9.5 - 11.5 (cc/1000st)          |                                   | 2.0             |
| 1-5               | Start                      | 100            | 50.0 - 70.0 (cc/1000st)         |                                   |                 |
| 1-6               | Full-load speed regulation | 2700           | 12.0 - 16.0 (cc/1000st)         |                                   |                 |
| 1-7               |                            |                |                                 |                                   | 4.5             |

#### 2. Test values

|                       |                               |                     |                   |                   |  |
|-----------------------|-------------------------------|---------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 1000<br>2.4 - 3.0   | 1800<br>5.8 - 7.0 | 2400<br>8.0 - 9.0 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 1000<br>3.9 - 4.5   | 1800<br>5.6 - 6.4 | 2400<br>7.1 - 7.9 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 1000<br>43.0 - 97.0 |                   |                   |  |

#### 2-4 Fuel injection quantities

| Control lever position | Speed<br>rpm                                      | Fuel delivery<br>(cc/1000 strokes) | Charge-air<br>pres(mmHg) | Difference (cc) |
|------------------------|---|------------------------------------|--------------------------|-----------------|
| End stop               | 1400  | 36.2 - 38.2                        |                          |                 |
|                        | 600   | 29.8 - 34.8                        |                          |                 |
|                        | 1000  | 31.3 - 36.3                        |                          |                 |
|                        | 1800  | 36.1 - 40.1                        |                          |                 |
|                        | 2400  | 34.7 - 39.7                        |                          |                 |
|                        | 2700  | 11.5 - 16.5                        |                          |                 |
|                        | 2800  | below 5.0                          |                          |                 |
| Switch off             | 350   | 0                                  |                          |                 |
| Idle<br>stop           | 700   | below 5.0                          |                          |                 |
|                        | 350   | 9.5 - 11.5                         |                          |                 |
| Partial load           | 700   | 12.0 - 24.0                        |                          |                 |
| 2-5<br>Solenoid        | Cut-in voltage max.: 8V<br>Test voltage: 12 - 14V |                                    |                          |                 |

| 3. Dimensions       |                   |
|---------------------|-------------------|
| K                   | 3.2 - 3.4 mm      |
| KF                  | 6.68 - 6.88 mm    |
| MS                  | 0.7 - 0.9 mm      |
| BCS                 | - mm              |
| Pre-str.            | - mm              |
| Control lever angle |                   |
| α                   | 23° - 27° deg     |
| A                   | 14.1 - 19.4 mm    |
| β                   | 39° - 49° deg     |
| B                   | 12.2 - 15.7 mm    |
| γ                   | 10.5° - 11.5° deg |
| C                   | 6.8 - 7.4 mm      |

B1

ZEXEL - Test values

Injection pumps



B2

ZEXEL - Test values

Injection pumps



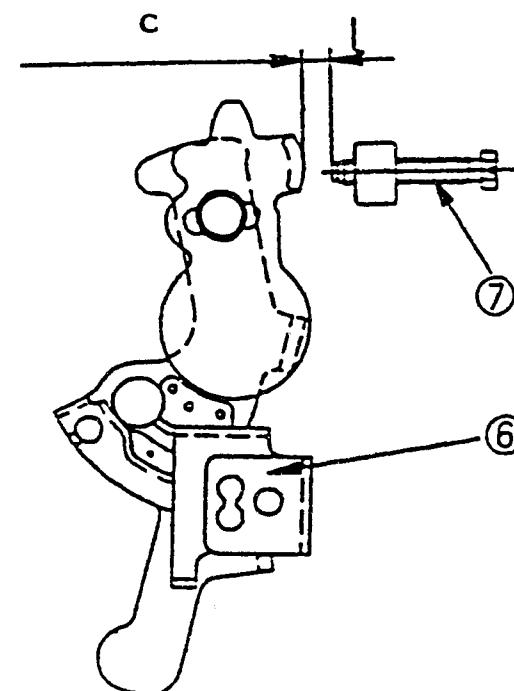
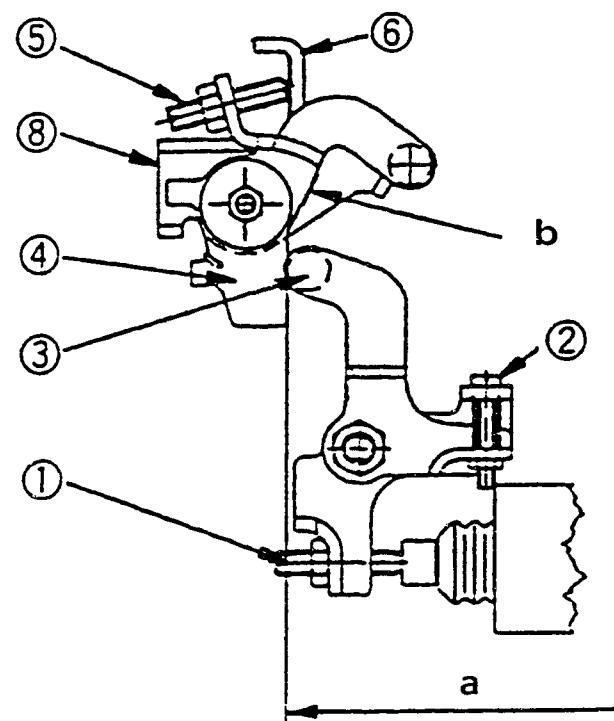


Figure 8

a = Vertical position  
b = Aligning mark

c = Block gauge

■ W-CSD ADJUSTMENT

1. Timer Stroke Adjustment (adjust to the thick line)
  - 1) Calculate the timer stroke from Fig. 9 according to the atmospheric temperature at the time of adjustment.
  - 2) Adjust using the timer stroke adjusting screw so that the timer stroke is as calculated in Fig. 9 (diagram).

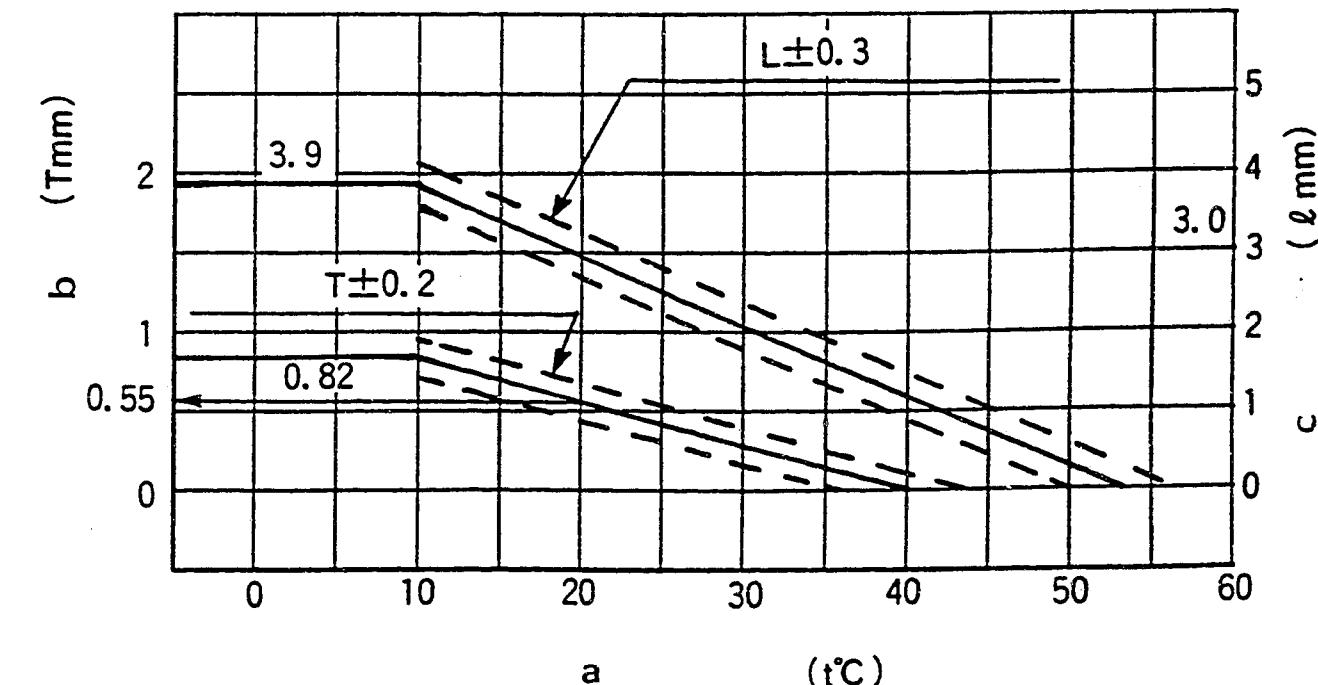


Figure 9

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a = Atmospheric temperature  
b = Timer stroke  
c = Gap between control lever  
and idling stopper bolt

(Continued)

## 2. Intermediate Lever Position Adjustment

- 1) Insert a block gauge (thickness gauge) of  $3.0 \pm 0.05$  mm thickness between the control lever and the idling stopper bolt.
- 2) Insert a block gauge (thickness gauge) of  $5.3 \pm 0.05$  mm thickness between the intermediate lever and the intermediate lever braket.
- 3) Align the intermediate lever with the aligning mark.
- 4) Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.



3. CSD Lever Adjustment (adjust to the thick line)

- 1) Calculate the block gauge dimension  $l \pm 0.05$  mm from (Fig. 9) according to the atmospheric temperature at the time of adjustment.
- 2) Insert the block gauge (thickness gauge) between the control lever and the idling stopper bolt.
- 3) Using the idling bolt, adjust so that the CSD lever roller and the intermediate lever are in contact.

4. Final Adjustment

After completing the adjustment, screw the timer stroke adjusting screw two turns clockwise.  
(Move from the temporary adjustment chart to the final adjustment chart).

**Note:**

1. The temperature of the wax must be below 30°C when adjusting.
2. When inserting a block gauge (thickness gauge) between the control lever (bracket) and the idling stopper bolt, use the idling adjusting bolt to separate the CSD lever and the intermediate lever so that no excessive force is exerted on them.

$$\theta \text{ (}^{\circ}\text{C)} \leq 10$$

$$TA = 0.82$$

$$\theta \text{ (}^{\circ}\text{C)} \leq 10$$

$$L = 3.9$$

$$10 \leq \theta \text{ (}^{\circ}\text{C)} \leq 20$$

$$TA = -0.027 \theta + 1.09$$

$$10 \leq \theta \text{ (}^{\circ}\text{C)} \leq 30$$

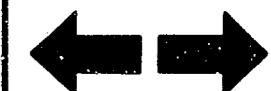
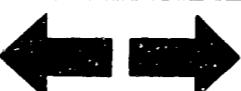
$$L = -0.09 \theta + 4.8$$

$$20 \leq \theta \text{ (}^{\circ}\text{C)} \leq 40$$

$$TA = -0.0275 \theta + 1.1$$

$$30 \leq \theta \text{ (}^{\circ}\text{C)} \leq 54.3$$

$$L = -0.086 \theta + 4.68$$



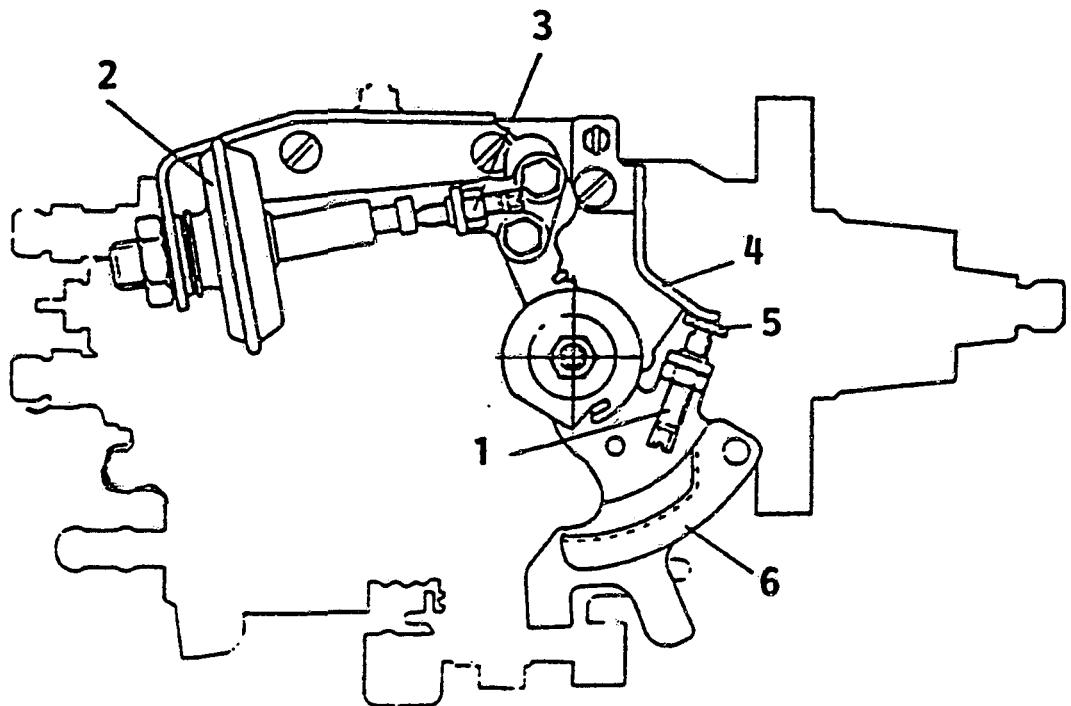


Figure 10

104740-2194 4/4

- 1 = Idling stopper bolt
- 2 = Dashpot
- 3 = Dashpot adjusting screw
- 4 = Bracket
- 5 = Block gauge
- 6 = Control lever

#### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $6.0 \pm 0.05$  mm in the gap between the bracket and the idling stopper bolt.

(Continued)

2. With the control lever positioned as described in point 1., adjust the dashpot adjusting screw so that the dashpot adjusting screw and the push rod are in contact.

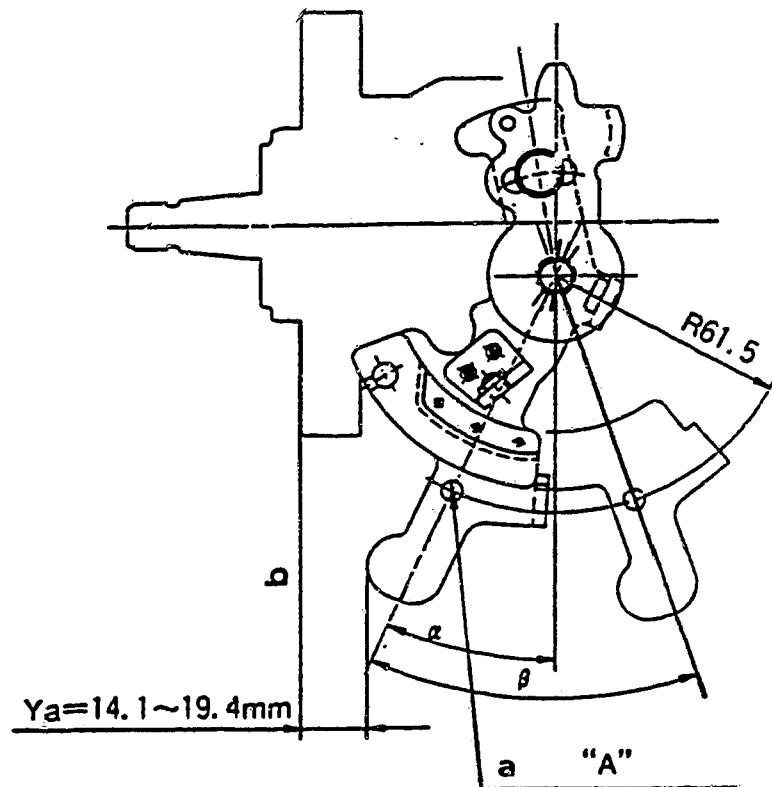
Fix the screw using the nut.

3. Adjust the dash pot mounting position so that the dash pot of the tip and the control lever are in contact. Fix the dash pot using the nut.

**Caution:**

- The adjusting screw and the pushrod must move together smoothly.
- Confirm that the control lever returns to the idling position.





104740-2194 4/4

(Continued)

Figure 11

a = Measured position  
 b = End face of flange

■ CONTROL LEVER ANGLE MEASUREMENT POSITION

1) Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole "A".



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL-TEST VALUES  
Distributors pumps  
Engine model: CD20

1/6

BOSCH No. 9 460 610 480  
ZEXEL No. 104740-2224  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 1670060J00

Injection pump no. 104640-2224

(NP-VE4/10F2500LNP867)

Pump rotation.: Counter clockwise-viewed  
from drive side

Test-nozzle holder combination:  
1 688 901 022

Test pressure line:  
1 680 750 073

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------|----------------------------|----------------|---------------------------------|-----------------------------------|-----------------|
| 1-1               | Timing device travel       | 1000           | 2.5 - 2.9 (mm)                  |                                   |                 |
| 1-2               | Supply pump pressure       | 1000           | 3.9 - 4.5 (kg/cm <sup>2</sup> ) |                                   |                 |
| 1-3               | Full load delivery         | 1400           | 36.7 - 37.7 (cc/1000st)         |                                   | 3.0             |
|                   | Full load delivery         |                | (cc/1000st)                     |                                   |                 |
| 1-4               | Idle speed regulation      | 350            | 9.5 - 11.5 (cc/1000st)          |                                   | 2.0             |
| 1-5               | Start                      | 100            | 50.0 - 70.0 (cc/1000st)         |                                   |                 |
| 1-6               | Full-load speed regulation | 2700           | 12.0 - 16.0 (cc/1000st)         |                                   |                 |
| 1-7               |                            |                |                                 |                                   | 4.5             |

#### 2. Test values

|                       |                               |                     |                   |                   |  |
|-----------------------|-------------------------------|---------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 1000<br>2.4 - 3.0   | 1800<br>5.8 - 7.0 | 2400<br>8.0 - 9.0 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 1000<br>3.9 - 4.5   | 1800<br>5.7 - 6.3 | 2400<br>7.1 - 7.9 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 1000<br>43.0 - 87.0 |                   |                   |  |

#### 2-4 Fuel injection quantities

| Control lever position | Speed<br>rpm                                      | Fuel delivery<br>(cc/1000 strokes) | Charge-air<br>pres(mmHg) | Difference (cc) |
|------------------------|---|------------------------------------|--------------------------|-----------------|
| End stop               | 1400  | 36.2 - 38.2                        |                          |                 |
|                        | 600   | 30.9 - 34.9                        |                          |                 |
|                        | 1000  | 30.5 - 34.5                        |                          |                 |
|                        | 1800  | 36.1 - 40.1                        |                          |                 |
|                        | 2400  | 35.7 - 39.7                        |                          |                 |
|                        | 2700  | 11.5 - 16.5                        |                          |                 |
|                        | 2800  | below 5.0                          |                          |                 |
| Switch off             | 350   | 0                                  |                          |                 |
| Idle<br>stop           | 750   | below 5.0                          |                          |                 |
|                        | 350   | 9.5 - 11.5                         |                          |                 |
| Partial load           | 700   | 12.0 - 24.0                        |                          |                 |
| 2-5<br>Solenoid        | Cut-in voltage max.: 8V<br>Test voltage: 12 - 14V |                                    |                          |                 |

#### 3. Dimensions

|          |                |
|----------|----------------|
| K        | 3.2 - 3.4 mm   |
| KF       | 6.68 - 6.88 mm |
| MS       | 0.7 - 0.9 mm   |
| BCS      | - mm           |
| Pre str. | - mm           |

#### Control lever angle

|          |                   |
|----------|-------------------|
| $\alpha$ | 23° - 27° deg     |
| A        | 14.1 - 19.4 mm    |
| $\beta$  | 39° - 49° deg     |
| B        | 12.2 - 15.7 mm    |
| $\gamma$ | 15.6° - 16.6° deg |
| C        | 10.0 - 10.7 mm    |



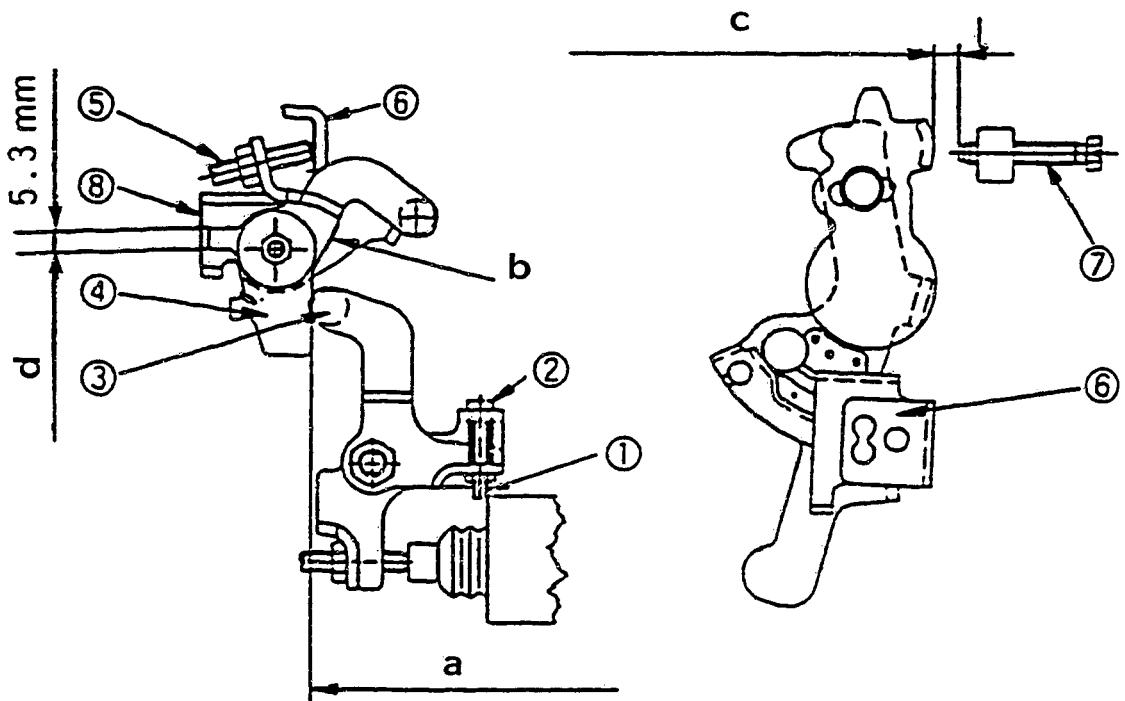


Figure 12

104740-2224 2/6

a = Vertical position  
 b = Aligning mark

c = Block gauge  
 d = Shim

■ W-CSD Adjustment

1. Intermediate Lever Position Adjustment

- 1) Insert a block gauge (thickness gauge) of  $3.0 \pm 0.05$  mm thickness between the control lever and the idling stopper bolt.
- 2) Insert a shim of  $5.3 \pm 0.05$  mm thickness between the bracket and the intermediate lever.
- 3) Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.

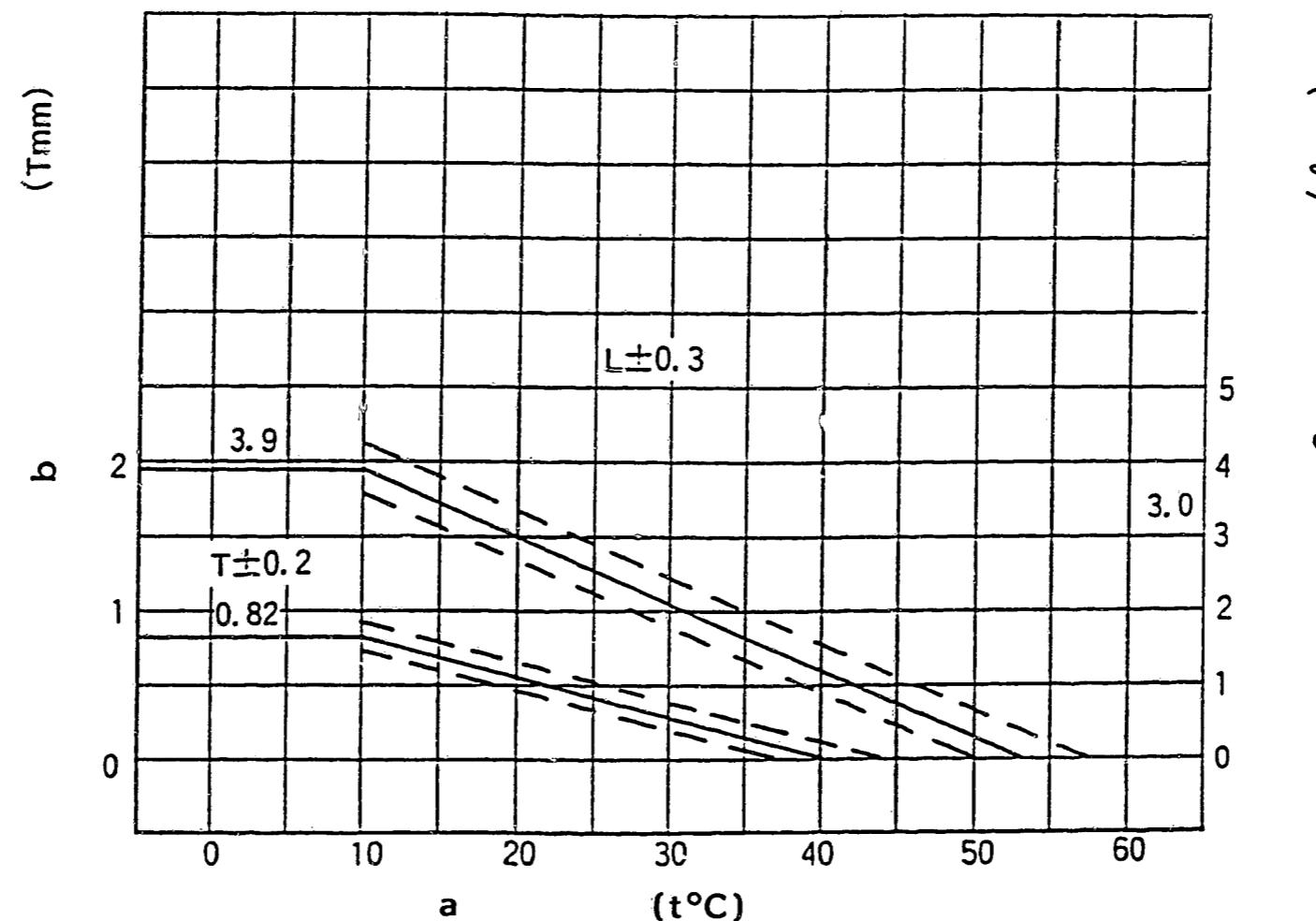


Figure 13

104740-2224 3/6

a = Atmospheric temperature

b = Timer stroke

c = Gap between control lever  
and idling stopper bolt

2. CSD Lever Adjustment (adjust to the thick line)

- 1) Calculate the block gauge dimension  $l \pm 0.05$  mm from (Fig. 13) according to the atmospheric temperature at the time of adjustment.
- 2) Insert the block gauge (thickness gauge) between the control lever and the idling stopper bolt.
- 3) In the above condition, adjust screw (2) so that the intermediate lever setting screw contacts the control lever. Then, tighten nut (1) to fix the screw.



**Note:**

1. The temperature of the wax must be below 30°C when adjusting.

 $\theta$  (°C) ≤ 10

$$TA = 0.82$$

 $\theta$  (°C) ≤ 10

$$L = 3.9$$

 $10 \leq \theta$  (°C) ≤ 20

$$TA = -0.027 \theta + 1.09$$

 $10 \leq \theta$  (°C) ≤ 30

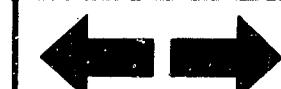
$$L = -0.09 \theta + 4.8$$

 $20 \leq \theta$  (°C) ≤ 40

$$TA = -0.0275 \theta + 1.1$$

 $30 \leq \theta$  (°C) ≤ 54.3

$$L = -0.086 \theta + 4.68$$



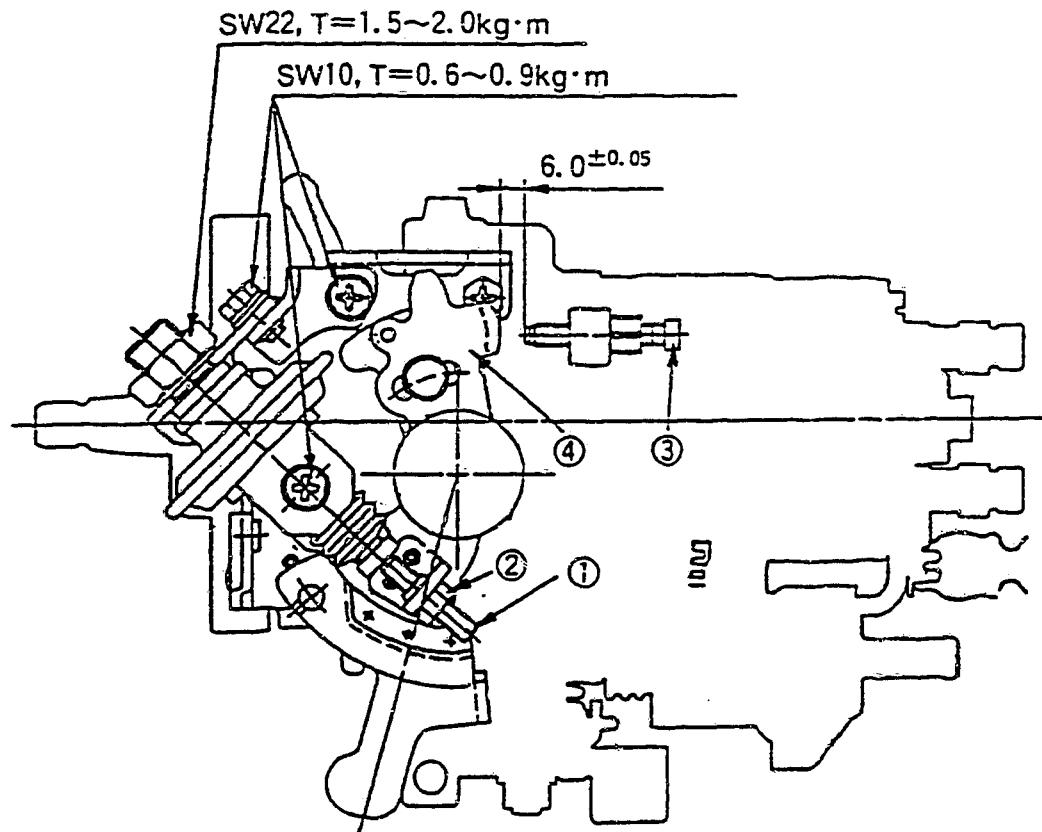


Figure 14

104740-2224 4/6

### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $6.0 \pm 0.05$  mm in the gap between the control lever and the idling stopper bolt.
2. With the control lever positioned as described in point 1. above, adjust the dashpot adjusting screw so that the dashpot adjusting screw and the push rod are in contact.  
Fix the screw using the nut.

**Caution:**

- The adjusting screw and the pushrod must move together smoothly.
- Confirm that the control lever returns to the idling position.

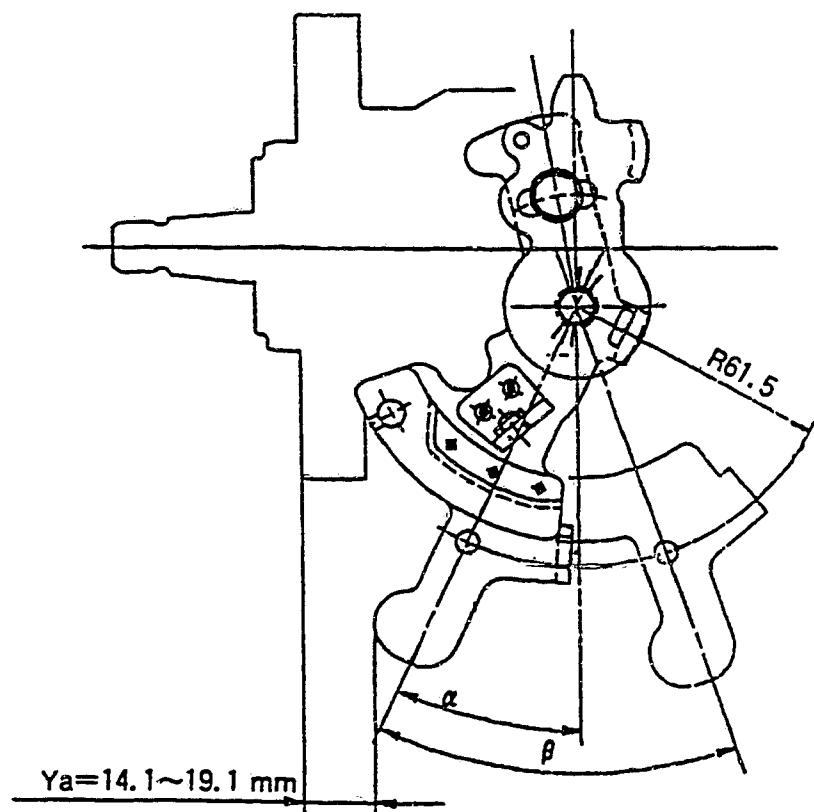


Figure 15

104740-2224 5/6

■ CONTROL LEVER ANGLE MEASUREMENT POSITION

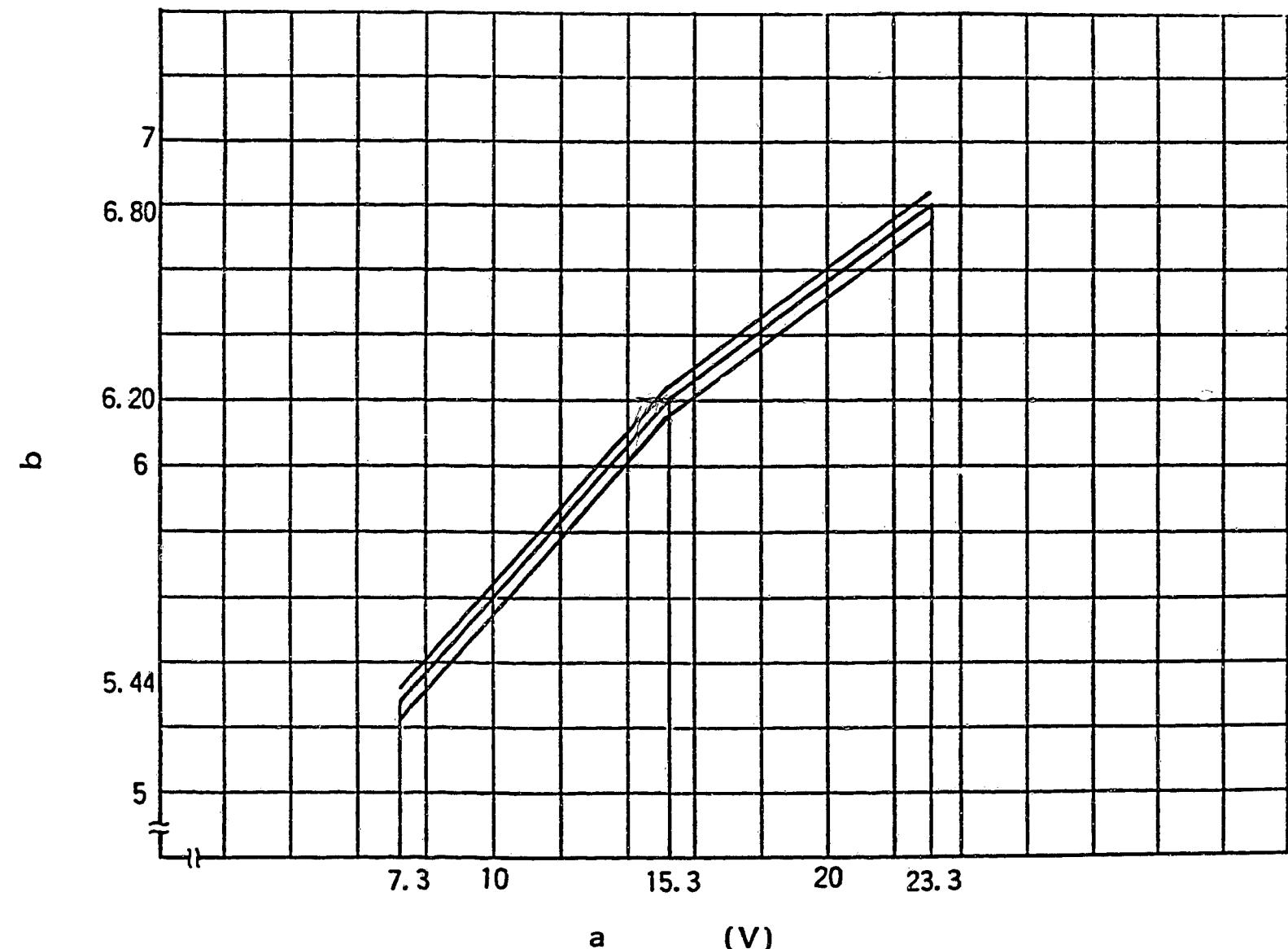


Figure 16

104740-2224 6/6

a = Out-put voltage

b = Fuel injection quantity ( $\text{cm}^3/1000\text{st}$ )

■ POTENTIOMETER ADJUSTMENT

Fuel injection quantity  $Q < 14.2 \text{ cm}^3/1000\text{st} \rightarrow V \pm 0.03 = 0.0978 Q + 4.7259$

Fuel injection quantity  $Q \geq 14.2 \text{ cm}^3/1000\text{st} \rightarrow V \pm 0.03 = 0.0752 Q + 5.0457$

Under the following conditions, alter the potentiometer's installation position so that the out-put voltage equals the specified value.

| Adjustment Conditions  |                  |                                     | Specified Value     | Remarks       |
|------------------------|------------------|-------------------------------------|---------------------|---------------|
| Control lever position | Pump speed (rpm) | Fuel injection quantity (cc/1000st) | Out-put voltage (V) |               |
| Approx. 16.1°          | 1200             | Measure                             | Measure             | Adjust. point |
| Idle                   | -                | -                                   | -                   | Check point   |
| Full speed             | -                | -                                   | -                   | Check point   |

(In-put voltage: 10V)

\* A control lever position of approx. 16.1° means that a block gauge of 10.3 mm thickness is inserted between the control lever and the idling stopper bolt.



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: 4D56

1/2

BOSCH No. 9 460 610 467  
ZEXEL No. 104740-3633  
Date: 30.05.1991 [0]  
Company: MITSUBISHI  
No. MD103206

Injection pump no.: 104640-3343

(NP-VE4/10F2100RNP432)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:

1 688 901 000

Test pressure line:

1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  |  | Charge-air pressure<br>bar (mmHg) | Difference in<br>delivery (cc) |
|-------------------|----------------------------|----------------|---------------------------------|--|-----------------------------------|--------------------------------|
| 1-1               | Timing device travel       | 1250           | 3.5 - 3.9 (mm)                  |  |                                   |                                |
| 1-2               | Supply pump pressure       | 1250           | 4.5 - 5.1 (kg/cm <sup>2</sup> ) |  |                                   |                                |
| 1-3               | Full load delivery         | 1250           | 45.3 - 46.3 (cc/1000st)         |  |                                   | 3.0                            |
|                   | Full load delivery         |                | - (cc/1000st)                   |  |                                   |                                |
| 1-4               | Idle speed regulation      | 375            | 6.5 - 9.5 (cc/1000st)           |  |                                   | 2.0                            |
| 1-5               | Start                      | 100            | 63.0 - 83.0 (cc/1000st)         |  |                                   |                                |
| 1-6               | Full-load speed regulation | 2550           | 15.1 - 21.1 (cc/1000st)         |  |                                   |                                |
| 1-7               | Load-timer adjustment      | 1250           | T = 0.4-0.8 (mm)                |  |                                   | 4.0                            |

2. Test values

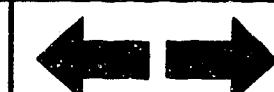
|                       |                               |                  |                |                   |                 |  |
|-----------------------|-------------------------------|------------------|----------------|-------------------|-----------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 500<br>0.6-1.8   | 750<br>1.4-2.6 | 1250<br>3.3-4.1   | 2100<br>6.6-7.8 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 600<br>2.9 - 3.5 |                | 1250<br>4.5-5.1   | 2100<br>6.5-7.1 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             |                  |                | 1250<br>48.0-92.0 |                 |  |

2-4 Fuel injection quantities

| Speed control lever pos. | Speed<br>(rpm)                                     | Fuel delivery<br>(cc/1000st)  | Charge-air<br>pres(mmHg) | Difference in<br>delivery (cc) |
|--------------------------|--|---|--------------------------|--------------------------------|
| End stop                 | 1250<br>600<br>2100<br>2550<br>2900                | 44.8 - 46.8<br>42.3 - 46.3<br>37.2 - 41.2<br>13.1 - 23.1<br>below 5.0 |                          |                                |
| Switch off               | 375  | 0   |                          |                                |
| Idle-<br>stop            | 600<br>375   | below 3.0<br>6.0 - 10.0   |                          |                                |
| 2-5<br>Solenoid          | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |   |                          |                                |

3. Dimensions

|                     |                |
|---------------------|----------------|
| K                   | 3.2 - 3.4 mm   |
| KF                  | 5.7 - 5.9 mm   |
| MS                  | 1.1 - 1.3 mm   |
| BCS                 | - mm           |
| Pre-st.             | - mm           |
| Control lever angle |                |
| $\alpha$            | 55 - 63° deg   |
| A                   | 10.5 - 16.0 mm |
| $\beta$             | 41 - 51° deg   |
| B                   | 12.5 - 16.5 mm |
| $\gamma$            | - deg          |
| C                   | - mm           |



## 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

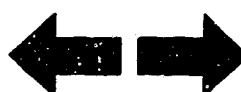
Boost Pressure: - mmHg  
 Pump Speed : 1250 rpm  
 Fuel Injection Quantity: 35.2 - 36.2 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1/2)

## 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

| Control lever position |   |                             | Specified values     |   |
|------------------------|---|-----------------------------|----------------------|---|
| Pump speed<br>(rpm)    | Fuel injection<br>quantity<br>(cc/1000st) | Boost<br>pressure<br>(mmHg) | Timer stroke<br>(mm) | Timer stroke<br>reduction value<br>(mm) |
| 1250                   | 34.7 - 36.7                               | -                           | (3.1)                | 0.2 - 1.0                               |
| 1250                   | 26.7 - 29.7                               | -                           | (2.3)                | 0.8 - 2.0                               |



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: 4D56

1/3

BOSCH No. 9 460 610 490  
ZEXEL No. 104740-8100  
Date: 31.05.1991 [0]  
Company: MITSUBISHI  
No. MD163890

Injection pump no.: 104640-8100

(NP-VE4/10F2100RNP926)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:

1 688 901 000

Test pressure line:

1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  |  | Charge-air pressure<br>bar (mmHg) | Difference in<br>delivery (cc) |
|-------------------|----------------------------|----------------|---------------------------------|--|-----------------------------------|--------------------------------|
| 1-1               | Timing device travel       | 1250           | 3.5 - 3.9 (mm)                  |  | 540 - 560                         |                                |
| 1-2               | Supply pump pressure       | 1250           | 4.5 - 5.1 (kg/cm <sup>2</sup> ) |  | 540 - 560                         |                                |
| 1-3               | Full load delivery         | 1250(Full)     | 61.4 - 62.4 (cc/1000st)         |  | 540 - 560                         |                                |
|                   | Full load delivery         | 750 (BCS)      | 60.4 - 61.4 (cc/1000st)         |  | 320 - 340                         | 4.5                            |
| 1-4               | Idle speed regulation      | 375            | 8.5 - 11.5 (cc/1000st)          |  | 0                                 | 2.0                            |
| 1-5               | Start                      | 100            | 43.0 - 83.0 (cc/1000st)         |  | 0                                 |                                |
| 1-6               | Full-load speed regulation | 2650           | 22.2 - 28.2 (cc/1000st)         |  | 540 - 560                         |                                |
| 1-7               | Load-timer adjustment      | 1250           | T = 0.4-0.8 (mm)                |  | 540 - 460                         | 5.5                            |

2. Test values

|                       |                               |                |                |                |                   |                 |
|-----------------------|-------------------------------|----------------|----------------|----------------|-------------------|-----------------|
| 2-1 Timing device     | N = rpm<br>mm                 | 500<br>0.6-1.8 |                | 750<br>1.1-2.3 | 1250<br>3.4-4.0   | 2100<br>5.7-7.6 |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> |                | 600<br>2.9-3.5 |                | 1250<br>4.5 - 5.1 | 2100<br>6.5-7.1 |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             |                |                |                | 1250<br>48 - 92   |                 |

2-4 Fuel injection quantities

| Speed control lever pos. | Speed<br>(rpm)                                     | Fuel delivery<br>(cc/1000st) | Charge-air<br>pres(mmHg) | Difference in<br>delivery (cc) |
|--------------------------|--|------------------------------|--------------------------|--------------------------------|
| End stop                 | 1250(Full)   | 60.9 - 62.9                  | 540 - 560                |                                |
|                          | 750 (BCS)  | 59.9 - 60.9                  | 320 - 340                |                                |
|                          | 600  | 45.8 - 50.8                  | 0                        |                                |
|                          | 2100   | 54.1 - 59.1                  | 540 - 560                |                                |
|                          | 2650   | 21.7 - 28.7                  | 540 - 560                |                                |
|                          | 3050   | below 5.0                    | 540 - 560                |                                |
| Switch off               | 375  | 0                            | 0                        |                                |
| Idle-<br>stop            | 750  | below 3.0                    | 0                        |                                |
|                          | 375  | 8.5 - 11.5                   | 0                        |                                |
| 2-5<br>Solenoid          | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |                              |                          |                                |

3. Dimensions

|                     |                |
|---------------------|----------------|
| K                   | 3.2 - 3.4 mm   |
| KF                  | 5.7 - 5.9 mm   |
| MS                  | 0.9 - 1.1 mm   |
| BCS                 | - mm           |
| Pre-str.            | 0.84 - 0.88 mm |
| Control lever angle |                |
| $\alpha$            | 55 - 63° deg   |
| A                   | 10.9 - 16.0 mm |
| $\beta$             | 36 - 46° deg   |
| B                   | 11.4 - 15.0 mm |
| $\gamma$            | - deg          |
| C                   | - mm           |

C1

ZEXEL - Test values

Injection pumps



C2

ZEXEL - Test values

Injection pumps



## 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: 540 - 560 mmHg

Pump Speed : 1250 rpm

Fuel Injection Quantity: 49.5 - 50.5 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1/3).

## 2. Confirmation of Timer Characteristics

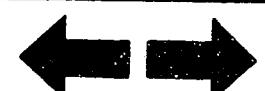
Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

| Control lever position |   |                             | Specified values     |   |
|------------------------|---|-----------------------------|----------------------|---|
| Pump speed<br>(rpm)    | Fuel injection<br>quantity<br>(cc/1000st) | Boost<br>pressure<br>(mmHg) | Timer stroke<br>(mm) | Timer stroke<br>reduction value<br>(mm) |
| 1250                   | 49.0 - 51.0                               | 540 - 560                   | -                    | 0.3 - 0.9                               |
| 1250                   | 38.5 - 41.5                               | 540 - 560                   | -                    | 0.9 - 1.9                               |



**■ FICD MOUNTING POSITION ADJUSTMENT**

1. Hold the control lever in the idling position.
2. Position the FICD mounting bracket so that the gap between the control lever and the FICD lever is  $1^{\pm 1}$  mm.

**C5****ZEXEL - Test values****Injection pumps**

Test oil  
ISO 4113 or  
SAE J967d

ZEXEL- TEST VALUES  
Distributor pumps  
Engine model: 4JB1-TC

1/4

BOSCH No. 9 460 610 453  
ZEXEL No. 104741-5240  
Date: 30.05.1991 [0]  
Company: ISUZU  
No. 8970283300

Injection pump no.: 104641-5240

(NP-VE4/11F1900RNP773)

Pump rotation: clockwise viewed from  
drive side

Test-nozzle holder combination:  
1 688 901 022

Test pressure line:  
1 680 750 073

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  |  | Charge-air pressure<br>bar (mmHg) | Difference<br>(cc) |
|-------------------|----------------------------|----------------|---------------------------------|--|-----------------------------------|--------------------|
| 1-1               | Timing device travel       | 1500           | 4.9 - 5.3 (mm)                  |  | 590 - 610                         |                    |
| 1-2               | Supply pump pressure       | 1500           | 4.7 - 5.1 (kg/cm <sup>2</sup> ) |  | 590 - 610                         |                    |
| 1-3               | Full load delivery         | 1250 (Full)    | 64.7 - 65.7 (cc/1000st)         |  | 590 - 610                         | 3.5                |
|                   | Full load delivery         | 800 (BCS)      | 45.3 - 46.3 (cc/1000st)         |  | 295 - 315                         | 4.5                |
| 1-4               | Idle speed regulation      | 385            | 6.1 - 10.1 (cc/1000st)          |  | 0                                 | 2.0                |
| 1-5               | Start                      | 100            | 80.0 - 90.0 (cc/1000st)         |  | 0                                 |                    |
| 1-6               | Full-load speed regulation | 2300           | 16.6 - 22.6 (cc/1000st)         |  | 590 - 610                         | 4.5                |
| 1-7               |                            |                |                                 |  |                                   |                    |

2. Test values

|                       | Solenoid timer<br>N = rpm<br>mm | ON               |                  | OFF             |                  |                 |
|-----------------------|---------------------------------|------------------|------------------|-----------------|------------------|-----------------|
|                       |                                 | 385<br>below 1.2 | 750<br>above 1.0 | 1250<br>1.3-2.5 | 1500<br>4.8-5.4  |                 |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup>   |                  |                  |                 | 1500<br>4.7-5.1  | 1900<br>5.8-6.4 |
| 2-3 Overflow delivery | N = rpm <sup>-1</sup><br>cc/10s |                  | 1500<br>63-107   |                 | 1500<br>78 - 168 |                 |

2-4 Fuel injection quantities

| Speed control lever pos. | Speed<br>(rpm)                                      | Fuel delivery<br>(cc/1000st) | Charge-air<br>pres(mmHg) | Difference<br>(cc) |
|--------------------------|---|------------------------------|--------------------------|--------------------|
| End stop                 | 1250(Full)  | 64.2 - 66.2                  | 590 - 610                |                    |
|                          | 800 (BCS)   | 44.8 - 46.8                  | 295 - 315                |                    |
|                          | 400   | 33.4 - 46.4                  | 0                        |                    |
|                          | 600   | 31.8 - 39.8                  | 130 - 150                |                    |
|                          | 1250  | 44.0 - 53.0                  |                          |                    |
|                          | 1900  | 62.0 - 73.0                  | 590 - 610                |                    |
|                          | 2300  | 16.1 - 23.1                  | 590 - 610                |                    |
|                          | 2400  | below 12.0                   | 590 - 610                |                    |
| Switch off               | 385   | 0                            | 0                        |                    |
| Idle-<br>stop            | 500   | below 3.0                    | 0                        |                    |
|                          | 385   | 6.1 - 10.1                   | 0                        |                    |
| Partial load             | 750   | 7.7 - 9.7                    | 590 - 610                |                    |
| 2-5<br>Solenoid          | Cut-in voltage max.: 8 V<br>Test voltage: 12 - 14 V |                              |                          |                    |

3. Dimensions

|         |                |
|---------|----------------|
| K       | 2.7 - 2.9 mm   |
| KF      | 5.4 - 5.6 mm   |
| MS      | 0.9 - 1.1 mm   |
| BCS     | 3.8 - 4.0 mm   |
| Prestr. | 0.43 - 0.47 mm |

Control lever angle

|          |                |
|----------|----------------|
| $\alpha$ | 20° - 28° deg  |
| A        | 11.4 - 14.9 mm |
| $\beta$  | 43° - 53° deg  |
| B        | 13.8 - 17.5 mm |
| $\gamma$ | - deg          |
| C        | - mm           |



## POTENTIOMETER ADJUSTMENT SPECIFICATIONS

| Pump speed<br>(rpm) | Out-put voltage<br>(V) | Injection quantity<br>mm <sup>3</sup> /st | Remarks            |
|---------------------|------------------------|---|--------------------|
| 750                 | 2.49 ± 0.03            | 8.7 ± 1<br>Boost = 600 mmHg               | Adjustment point   |
| 385                 | 0.96 ± 0.4             | 8.1 ± 2<br>(Idle)                         | Confirmation point |

(In-put voltage: 10V)

1. At a pump speed of 750 rpm, hold the control lever in a position where a fuel injection quantity of 7.7 - 9.7 mm<sup>3</sup>/st can be obtained.
2. Screw in the adjusting screw until it contacts the control lever and fix it using the locknut.
3. Adjust the potentiometer so that the out-put voltage is 2.46 - 2.52 V.

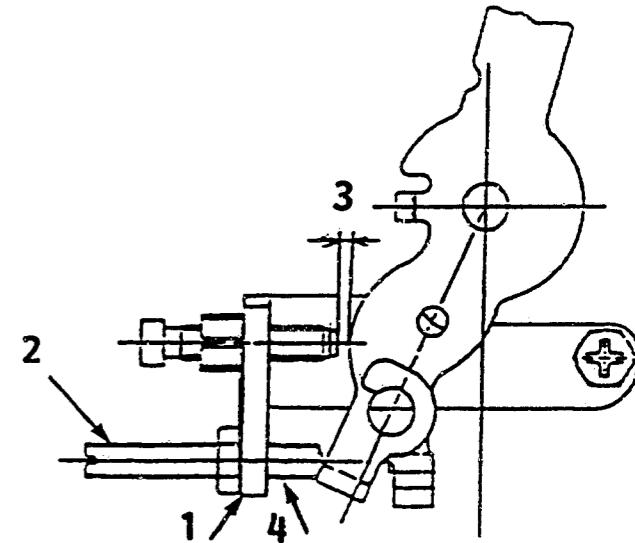
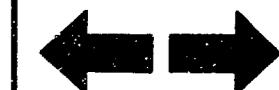


Fig. 17

- 1 = Adjusting screw installation bracket
- 2 = Adjusting screw
- 3 = Shim (thickness)
- 4 = Adjusting screw and locknut

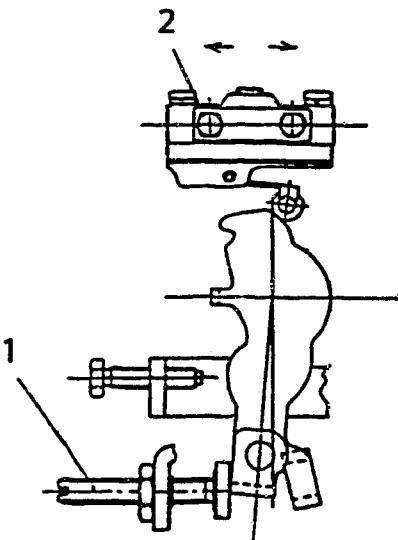


| Injection quantity specifications<br>(Boost pressure = 600 mmHg) |   | Microswitch adjustment specifications |                             |
|--|---|---------------------------------------|-----------------------------|
| Speed<br>(rpm)   | Injection quantity<br>(mm <sup>3</sup> /st) | Microswitch<br>operation              | Potentiometer output<br>(V) |
| 1000   | 50.6 ± 3.5                                  | ON → OFF                              | 4.56 ± 0.05                 |

1. Fix the adjusting screw used to adjust the potentiometer so that potentiometer output voltage is 4.56 V.
2. Move the microswitch in the direction of the arrow from the ON position to the OFF position, and fix it in this position.
3. Loosen the adjusting screw and confirm that potentiometer output voltage is 4.56 ± 0.05V when the microswitch moves from ON to OFF.

Figure 18

1 = Adjusting screw  
2 = Microswitch fixing bolt  
T = 0.2 - 0.3 kgm



■ Attach the timer's measuring device to the low pressure side.

■ Adjust the pump with the magnet valve OFF.

■ V-FICD ADJUSTMENT

1. Adjust the bracket so that the clearance S is  $1^{+1}$  mm.

2. Apply 400 mmHg negative pressure to the inside of the actuator and confirm that the actuator shaft moves the full stroke.

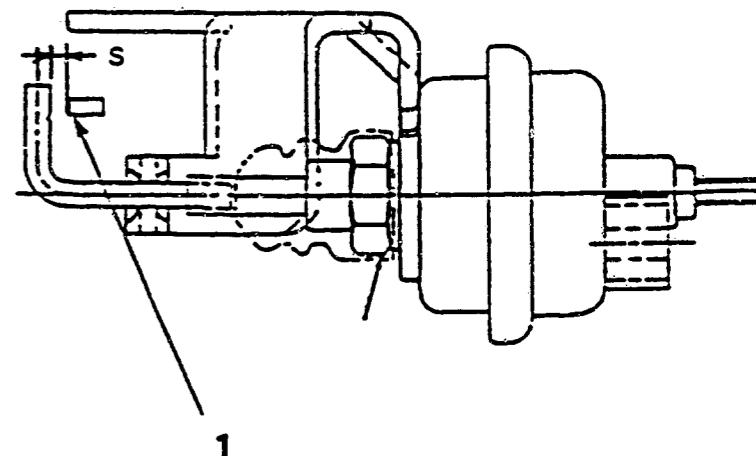


Figure 19

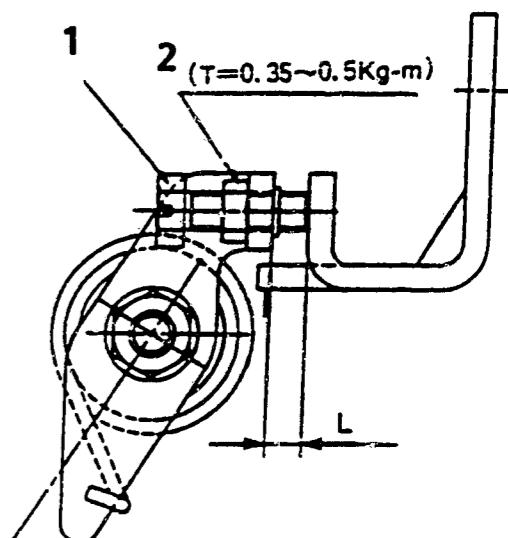
1 = Control lever (Idling position)

■ STARTING INJECTION QUANTITY ADJUSTMENT

Adjust the starting injection quantity (page 1/4) using the adjusting screw (as shown in the figure at right).

Figure 20

1 = Adjusting screw  
2 = Locknut



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: 4EC1

1/2

BOSCH No. 9 460 610 475  
ZEXEL No. 104748-1662  
Date: 30.05.1991 [0]  
Company: ISUZU  
No. 8944088701

Injection pump no.: 104648-1322

(NP-VE4/8F2600RNP392)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:

1 688 901 000

Test pressure line:

1 680 750 017

| 1. Setting values             |                            | Speed<br>(rpm)                                     | Setting values   |                          | Charge-air pressure<br>bar (mmHg) | Difference in<br>delivery (cc) |
|-------------------------------|----------------------------|--|--|--------------------------|-----------------------------------|--------------------------------|
| 1-1                           | Timing device travel       | 1250   | 2.9 - 3.3 (mm)   |                          |                                   |                                |
| 1-2                           | Supply pump pressure       | 1250   | 3.5 - 3.9 (kg/cm <sup>2</sup> )  |                          |                                   |                                |
| 1-3                           | Full load delivery         | 1250   | 28.0 - 29.0 (cc/1000st)  |                          |                                   | 2.5                            |
|                               | Full load delivery         |  | - (cc/1000st)  |                          |                                   |                                |
| 1-4                           | Idle speed regulation      | 375  | 4.4 - 8.4 (cc/1000st)  |                          |                                   | 2.0                            |
| 1-5                           | Start                      | 100  | above 50.0 (cc/1000st)   |                          |                                   |                                |
| 1-6                           | Full-load speed regulation | 2965   | 6.1 - 12.1 (cc/1000st)   |                          |                                   |                                |
| 1-7                           | Full-load delivery         |  |  |                          |                                   | 3.5                            |
| 2. Test values                |                            |  |  |                          |                                   |                                |
| 2-1                           | Timing device              | N = rpm<br>mm                                      | 520 - 720<br>0.5   | 1250<br>2.8-3.4          | 2000<br>5.5-6.7                   | 2300<br>7.0-7.8                |
| 2-2                           | Supply pump                | N = rpm<br>kg/cm <sup>2</sup>                      | 500<br>1.6-2.2   | 1250<br>3.5-3.9          | 2000<br>5.2-5.8                   | 2300<br>6.2-6.8                |
| 2-3                           | Overflow delivery          | N = rpm<br>cc/10s                                  |  | 1250<br>40.0-83.0        |                                   |                                |
| 2-4 Fuel injection quantities |                            |  |  |                          |                                   |                                |
| Speed control lever pos.      |                            | Speed<br>(rpm)                                     | Fuel delivery<br>(cc/1000st)   | Charge-air<br>pres(mmHg) | Difference in<br>delivery (cc)    |                                |
| End stop                      |                            | 1250<br>600<br>2500<br>2600<br>2700<br>2900 *      | 27.5 - 29.5<br>25.1 - 29.1<br>23.4 - 27.4<br>23.4 - 27.4<br>20.2 - 27.2<br>below 2.5 |                          |                                   |                                |
|                               |                            | 2965   | 5.6 - 12.6   |                          |                                   |                                |
| Switch off                    |                            | 375  | 0  |                          |                                   |                                |
| Idle-<br>stop                 |                            | 375<br>450   | 4.4 - 8.4<br>below 2.0   |                          |                                   |                                |
| 2-5<br>Solenoid               |                            | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |  |                          |                                   |                                |
| 3. Dimensions                 |                            |  |  |                          |                                   |                                |
| K                             | 3.2 - 3.4 mm               |  |  |                          |                                   |                                |
| KF                            | 5.7 - 5.9 mm               |  |  |                          |                                   |                                |
| MS                            | 1.5 - 1.7 mm               |  |  |                          |                                   |                                |
| BCS                           | - mm                       |  |  |                          |                                   |                                |
| Pre-st.                       | - mm                       |  |  |                          |                                   |                                |
| Control lever angle           |                            |  |  |                          |                                   |                                |
| $\alpha$                      | 16° - 24° deg              |  |  |                          |                                   |                                |
| A                             | 11.2 - 13.8 mm             |  |  |                          |                                   |                                |
| $\beta$                       | 40° - 50° deg              |  |  |                          |                                   |                                |
| B                             | 12.9 - 16.1 mm             |  |  |                          |                                   |                                |
| $\gamma$                      | - deg                      |  |  |                          |                                   |                                |
| C                             | - mm                       |  |  |                          |                                   |                                |

**■ V-FICD ADJUSTMENT**

1. Adjust the bracket so that the clearance S is  $1+1$  mm.
2. Apply 350 mmHg negative pressure to the inside of the actuator and confirm that the actuator shaft moves the full stroke.

**■ For items marked \*, confirmation is as follows:**

- a) Insert the shims ( $3.8 \pm 0.1$  mm thick) between the control lever and the full-speed stopper bolt.
- b) Confirm the fuel injection quantity at the specified pump speed.



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL-TEST VALUES  
Distributor pumps  
Engine model: 4EC1

1/4

BOSCH No. 9 460 610 481  
ZEXEL No. 104748-1723  
Date: 30.05.1991 [0]  
Company: ISUZU  
No. 8944685890

Injection pump no.: 104648-1373

(NP-VE4/8F2600RNP284)

Pump rot.: Clockwise viewed from drive side

Test-nozzle holder combination:

1 688 901 000

Test pressure line:

1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  |  | Charge-air pressure<br>bar (mmHg) | Difference<br>(cc) |
|-------------------|----------------------------|----------------|---------------------------------|--|-----------------------------------|--------------------|
| 1-1               | Timing device travel       | 1250           | 2.7 - 3.1 (mm)                  |  |                                   |                    |
| 1-2               | Supply pump pressure       | 1250           | 3.5 - 3.9 (kg/cm <sup>2</sup> ) |  |                                   | 2.5                |
| 1-3               | Full load delivery         | 1500           | 30.9 - 31.9 (cc/1000st)         |  |                                   |                    |
|                   | Full load delivery         |                |                                 |  |                                   |                    |
| 1-4               | Idle speed regulation      | 400            | 7.6 - 11.6 (cc/1000st)          |  |                                   | 2.0                |
| 1-5               | Start                      | 100            | 45.0 - 65.0 (cc/1000st)         |  |                                   |                    |
| 1-6               | Full-load speed regulation | 2850           | 12.9 - 18.9 (cc/1000st)         |  |                                   | 3.5                |
| 1-7               | Load-timer adjustment      | 1250           | T= 0.6-1.0 (mm)                 |  |                                   |                    |
| 1-8               |                            |                |                                 |  |                                   |                    |

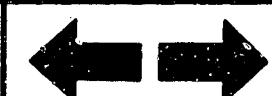
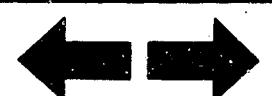
## 2. Test values

|                       |                               |                   |                     |                   |                   |  |
|-----------------------|-------------------------------|-------------------|---------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 1250<br>2.6 - 3.2 | 1500<br>3.7 - 4.7   | 2000<br>5.5 - 5.7 | 2300<br>7.0 - 7.8 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 500<br>1.6 - 2.2  | 1250<br>3.4 - 4.0   | 2000<br>5.2 - 5.8 | 2300<br>6.0 - 6.6 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             |                   | 1250<br>44.0 - 70.0 |                   |                   |  |

## 2-4 Fuel injection quantities

| Speed control lever pos. | Speed<br>(rpm)                                     | Fuel delivery<br>(cc/1000st) | Charge-air<br>pres (mmHg) | Difference<br>(cc) |
|--------------------------|--|------------------------------|---------------------------|--------------------|
| End stop                 | 1500   | 30.4 - 32.4                  |                           | 2.5                |
|                          | 600  | 27.9 - 31.9                  |                           |                    |
|                          | 2000   | 28.2 - 32.1                  |                           |                    |
|                          | 2400   | 26.4 - 30.4                  |                           |                    |
|                          | 2600   | 25.5 - 29.7                  |                           |                    |
|                          | 2850   | 12.4 - 19.4                  |                           | 3.5                |
|                          | 2975   | below 6.0                    |                           |                    |
| Switch off               | 400  | 0                            |                           |                    |
| Idle-<br>stop            | 400  | 7.6 - 11.6                   |                           |                    |
|                          | 500  | below 5.0                    |                           |                    |
| 2-5<br>Solenoid          | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |                              |                           |                    |

| 3. Dimensions       |               |
|---------------------|---------------|
| K                   | 3.2 - 3.4 mm  |
| KF                  | 5.7 - 5.9 mm  |
| MS                  | 1.3 - 1.5 mm  |
| BCS                 | - mm          |
| Pre-str.            | - mm          |
| Control lever angle |               |
| α                   | 16° - 24° deg |
| A                   | - mm          |
| β                   | 40° - 50° deg |
| B                   | - mm          |
| γ                   | - deg         |
| C                   | - mm          |



■ LOAD TIMER ADJUSTMENT

1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

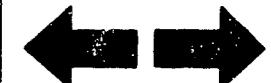
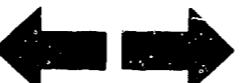
Boost Pressure: - mmHg  
 Pump Speed : 1250 rpm  
 Fuel Injection Quantity: 17.5 - 18.5 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1 - 7).

2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

| Control lever position |   |                             | Specified values     |   |
|------------------------|---|-----------------------------|----------------------|---|
| Pump speed<br>(rpm)    | Fuel injection<br>quantity<br>(cc/1000st) | Boost<br>pressure<br>(mmHg) | Timer stroke<br>(mm) | Timer stroke<br>reduction value<br>(mm) |
| 1250                   | 17.0 - 19.0                               | -                           | -                    | 0.5 - 1.1                               |
| 1250                   | 5.5 - 8.5                                 | -                           | -                    | 1.7 - 2.7                               |



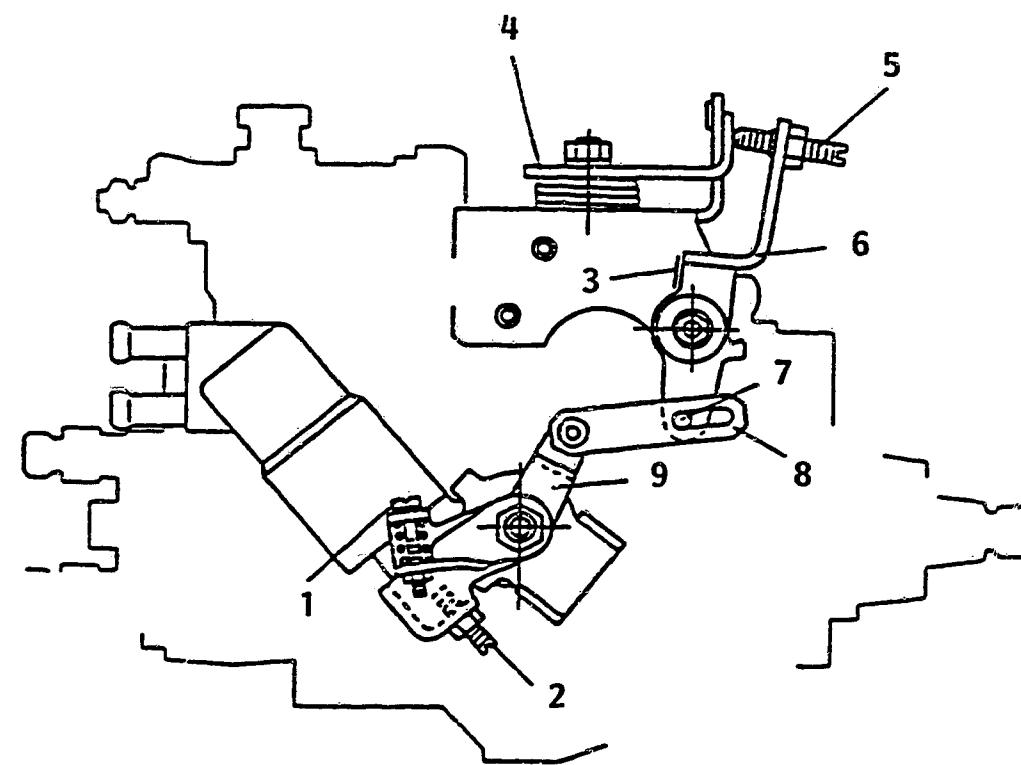
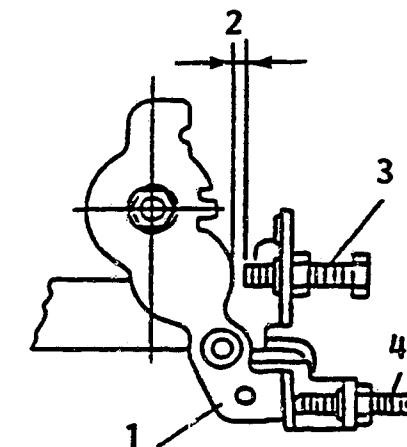


Figure 21

1 = Idling adjusting bolt  
 2 = Timer stroke adjusting screw  
 3 = Aligning mark  
 4 = Control lever

5 = Intermediate lever set screw  
 6 = Intermediate lever  
 7 = Pin  
 8 = Rod



104747-1723 3/4

1 = Control lever  
 2 = Intermediate lever set screw  
 3 = Idling stopper bolt  
 4 = Shim (l)

#### ■ W-CSD ADJUSTMENT

1. Timer Stroke Adjustment (adjust to the thick line)

1) Calculate the timer stroke from Fig. 22 according to the atmospheric temperature at the time of adjustment.

**C21**

ZEXEL - Test values  
Injection pumps



**C22**

ZEXEL - Test values  
Injection pumps



(Continued)

**2. Intermediate Lever Position Adjustment**

- 1) Insert a block gauge (thickness gauge) of  $1.2 \pm 0.05$  mm thickness between the control lever and the idling stopper bolt.
- 2) Align the intermediate lever with the aligning mark.
- 3) Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.

**C23**

ZEXEL - Test values

Injection pumps



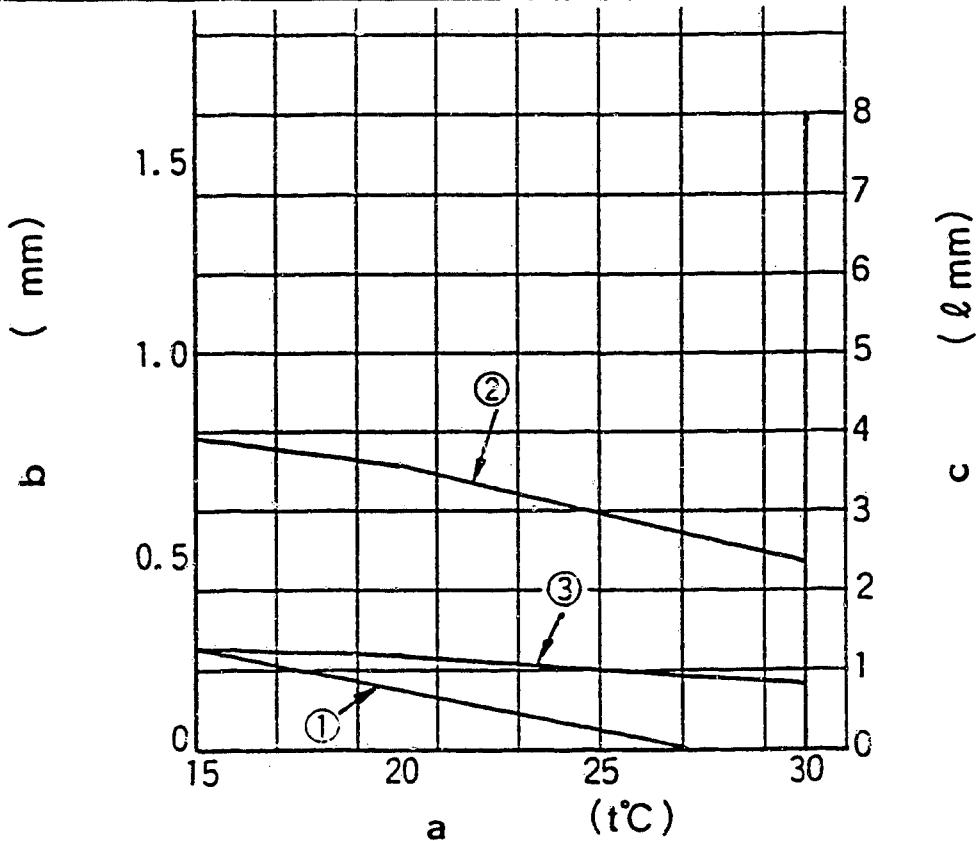


Figure 22

104748-1723 4/4

a = Atmospheric temperature  
 b = Timer stroke  
 c = Gap between control lever  
 and idling stopper bolt

3. CSD Lever Adjustment (adjust to the thick line)

- 1) Calculate the block gauge dimension  $l \pm 0.05$  mm from Fig. 22 according to the atmospheric temperature at the time of adjustment.
- 2) Insert the block gauge (thickness gauge) between the control lever and the idling stopper bolt.
- 3) Using the idling bolt, adjust so that the CSD lever rod and the intermediate lever pin are in contact.



(Continued)

Timer Stroke (mm):

$$TA = -0.0215 t + 0.585$$

Control Lever Angle (deg):

$$Q_1 = -0.0625 t + 4.85 \quad (-20^\circ C \leq t \leq 20^\circ C)$$

$$Q = -0.12 t + 6.0 \quad (20^\circ C < t \leq 50^\circ C)$$

Clearance between Control Lever and Idling Stopper Bolt (mm):

$$l_1 = -0.02075 t + 1.585 \quad (-20^\circ C \leq t \leq 20^\circ C)$$

$$l_2 = 0.039 t + 1.95 \quad (20^\circ C < t \leq 50^\circ C)$$



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: CD17

1/2

BOSCH No. 9 460 610 482  
ZEXEL No. 104748-2041  
Date: 30.05.1991 [3]  
Company: NISSAN  
No. 16700 16A15

Injection pump no: 104648-2001

(NP-VE4/8F2500LNP134)

Pump rotation: Counter clockwise-viewed from Test-nozzle holder combination:  
drive side 1 688 901 000

Test pressure line:  
1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------|----------------------------|----------------|---------------------------------|-----------------------------------|-----------------|
| 1-1               | Timing device travel       | 1200           | 1.8 - 2.4 (mm)                  |                                   |                 |
| 1-2               | Supply pump pressure       | 1200           | 3.1 - 3.7 (kg/cm <sup>2</sup> ) |                                   |                 |
| 1-3               | Full load delivery         | 1200           | 29.5 - 30.5 (cc/1000st)         |                                   | 2.5             |
|                   | Full load delivery         |                | (cc/1000st)                     |                                   |                 |
| 1-4               | Idle speed regulation      | 400            | 8.3 - 11.3 (cc/1000st)          |                                   | 3.0             |
| 1-5               | Start                      | 100            | 50.0 - 70.0 (cc/1000st)         |                                   |                 |
| 1-6               | Full-load speed regulation | 2700           | 11.9 - 17.9 (cc/1000st)         |                                   |                 |
| 1-7               | Load-timer adjustment      |                |                                 |                                   |                 |
| 1-8               |                            |                |                                 |                                   |                 |

## 2. Test values

|                       |                               |                     |                   |                   |  |
|-----------------------|-------------------------------|---------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 1200<br>1.7 - 2.5   | 1800<br>4.0 - 5.2 | 2500<br>6.8 - 8.0 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 1200<br>3.0 - 3.8   | 1800<br>4.4 - 5.2 | 2500<br>6.1 - 6.9 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 1200<br>36.0 - 80.0 |                   |                   |  |

## 2-4 Fuel injection quantities

| Control lever position | Speed<br>rpm                        | Fuel delivery<br>(cc/1000 strokes)                                    | Charge-air<br>pres(mmHg) | Difference<br>(cc) |
|------------------------|-------------------------------------|---|--------------------------|--------------------|
| End stop               | 1200<br>600<br>2500<br>2700<br>2900 | 29.0 - 31.0<br>24.8 - 28.8<br>26.7 - 30.7<br>11.4 - 18.4<br>below 6.0 |                          |                    |
| Switch off             | 400                                 | 0   |                          |                    |
| Idle<br>stop           | 400<br>600                          | 7.8 - 11.8<br>below 3.0   |                          |                    |
| Partial load           | 700                                 | 13.3 - 20.0   |                          |                    |
| 2-5<br>Solenoid        |                                     | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V                    |                          |                    |

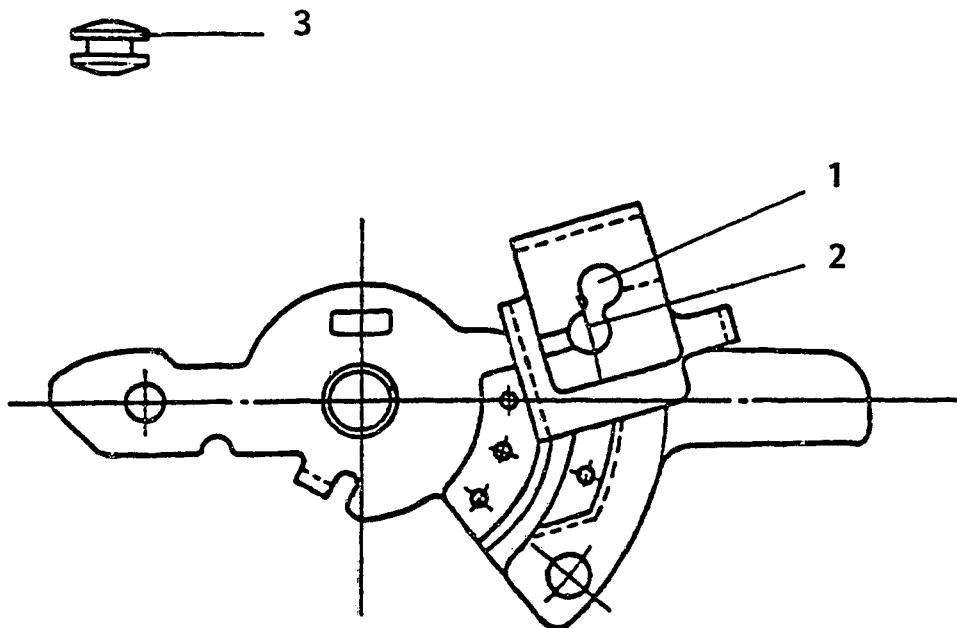
## 3. Dimensions

|         |              |
|---------|--------------|
| K       | 3.2 - 3.4 mm |
| KF      | 5.7 - 5.9 mm |
| MS      | 1.7 - 1.9 mm |
| BCS     | - mm         |
| Pre-st. | - mm         |

## Control lever angle

|          |                 |
|----------|-----------------|
| $\alpha$ | 21° - 29° deg   |
| A        | 2.5 - 8.0 mm    |
| $\beta$  | 37° - 47° deg   |
| B        | 10.7 - 14.8 mm  |
| $\gamma$ | 10.5 - 11.5 deg |
| C        | 6.7 - 7.3 mm    |





104748-2041 2/2

Figure 23

- 1 = Position A
- 2 = Position B
- 3 = Plug

#### ■ Plug Positions

The plug's installation position (shown above) depends on the value of control lever angle  $\beta$ .

**Position A:** When  $37^\circ$  (10.7 mm)  $\leq \beta < 41^\circ$  (12.4 mm)

**Position B:** When  $41^\circ$  (12.4 mm)  $\leq \beta \leq 47^\circ$  (14.8 mm)

Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: CD17

|           |                |
|-----------|----------------|
| BOSCH No. | 9 460 610 483  |
| ZEXEL No. | 104748-2100    |
| Date:     | 30.05.1991 [3] |
| Company:  | NISSAN         |
| No.       | 16700 16A01    |

Injection pump no: 104648-2070

(NP-VE4/8F2500LNP134)

Pump rotation: Counter clockwise-viewed from Test-nozzle holder combination:  
drive side 1 688 901 000

Test pressure line:  
1 680 750 017

| 1. Setting values      |  | Speed<br>(rpm)  | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc)   |
|------------------------|--|---|---------------------------------|-----------------------------------|-------------------|
| 1-1                    | Timing device travel                               | 1200  | 1.8 - 2.4 (mm)                  |                                   |                   |
| 1-2                    | Supply pump pressure                               | 1200  | 3.1 - 3.7 (kg/cm <sup>2</sup> ) |                                   |                   |
| 1-3                    | Full load delivery                                 | 1200  | 29.5 - 30.5 (cc/1000st)         |                                   | 2.5               |
|                        | Full load delivery                                 |   | (cc/1000st)                     |                                   |                   |
| 1-4                    | Idle speed regulation                              | 400   | 5.3 - 8.3 (cc/1000st)           |                                   | 3.0               |
| 1-5                    | Start  | 100   | 50.0 - 70.0 (cc/1000st)         |                                   |                   |
| 1-6                    | Full-load speed regulation                         | 2700  | 11.9 - 17.9 (cc/1000st)         |                                   |                   |
| 1-7                    | Load-timer adjustment                              |   |                                 |                                   |                   |
| 1-8                    |  |   |                                 |                                   |                   |
| 2. Test values         |  |   |                                 |                                   |                   |
| 2-1                    | Timing device                                      | N = rpm<br>mm   | 1200<br>1.7 - 2.5               | 1800<br>4.0 - 5.2                 | 2500<br>6.8 - 8.0 |
| 2-2                    | Supply pump  | N = rpm<br>kg/cm <sup>2</sup>   | 1200<br>3.0 - 3.8               | 1800<br>4.4 - 5.2                 | 2500<br>6.1 - 6.9 |
| 2-3                    | Overflow delivery                                  | N = rpm<br>cc/10s   | 1200<br>36.0 - 80.0             |                                   |                   |
| 2-4                    | Fuel injection quantities                          |   |                                 |                                   |                   |
| Control lever position | Speed<br>rpm                                       | Fuel delivery<br>(cc/1000 strokes)                                    | Charge-air<br>pres(mmHg)        | Difference<br>(cc)                |                   |
| End stop               | 1200<br>600<br>2500<br>2700<br>2900                | 29.0 - 31.0<br>24.8 - 28.8<br>26.7 - 30.7<br>11.4 - 18.4<br>below 6.0 |                                 |                                   |                   |
| Switch off             | 400  | 0   |                                 |                                   |                   |
| Idle                   | 400  | 4.8 - 8.8   |                                 |                                   |                   |
| stop                   | 600  | below 3.0   |                                 |                                   |                   |
| Partial load           | 700  | 10.0 - 20.0   |                                 |                                   |                   |
| 2-5                    | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |   |                                 |                                   |                   |

### 3. Dimensions

| K                   | 3.2 - 3.4 mm    |
|---------------------|-----------------|
| KF                  | 5.7 - 5.9 mm    |
| MS                  | 1.7 - 1.9 mm    |
| BCS                 | - mm            |
| Pre-st.             | - mm            |
| Control lever angle |                 |
| α                   | 21° - 29° deg   |
| A                   | 2.5 - 8.0 mm    |
| β                   | 39° - 49° deg   |
| B                   | 11.0 - 16.0 mm  |
| γ                   | 13.5 - 14.5 deg |
| C                   | 8.6 - 9.2 mm    |



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: CD17

1/2

BOSCH No. 9 460 610 484  
ZEXEL No. 104748-2110  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 16700 16A06

Injection pump no: 104648-2070

(NP-VE4/8F2500LNP134)

Pump rotation: Counter clockwise-viewed from  
drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

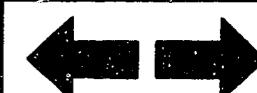
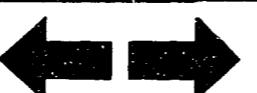
| 1. Setting values             |  | Speed<br>(rpm)  | Setting values                  |                    | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------------------|--|---|---------------------------------|--------------------|-----------------------------------|-----------------|
| 1-1                           | Timing device travel                               | 1200  | 1.8 - 2.4 (mm)                  |                    |                                   |                 |
| 1-2                           | Supply pump pressure                               | 1200  | 3.1 - 3.7 (kg/cm <sup>2</sup> ) |                    |                                   |                 |
| 1-3                           | Full load delivery                                 | 1200  | 29.5 - 30.5 (cc/1000st)         |                    |                                   | 2.5             |
|                               | Full load delivery                                 |   | (cc/1000st)                     |                    |                                   |                 |
| 1-4                           | Idle speed regulation                              | 400   | 8.3 - 11.3 (cc/1000st)          |                    |                                   |                 |
| 1-5                           | Start  | 100   | 50.0 - 70.0 (cc/1000st)         |                    |                                   | 3.0             |
| 1-6                           | Full-load speed regulation                         | 2700  | 11.9 - 17.9 (cc/1000st)         |                    |                                   |                 |
| 1-7                           | Load-timer adjustment                              |   |                                 |                    |                                   |                 |
| 1-8                           |  |   |                                 |                    |                                   |                 |
| 2. Test values                |  |   |                                 |                    |                                   |                 |
| 2-1                           | Timing device                                      | N = rpm<br>mm   | 1200<br>1.7 - 2.5               | 1800<br>4.0 - 5.2  | 2500<br>6.8 - 8.0                 |                 |
| 2-2                           | Supply pump  | N = rpm<br>kg/cm <sup>2</sup>   | 1200<br>3.0 - 3.8               | 1800<br>4.4 - 5.2  | 2500<br>6.1 - 6.9                 |                 |
| 2-3                           | Overflow delivery                                  | N = rpm<br>cc/10s   | 1200<br>36.0 - 80.0             |                    |                                   |                 |
| 2-4 Fuel injection quantities |  |   |                                 |                    |                                   |                 |
| Control lever position        | Speed<br>rpm                                       | Fuel delivery<br>(cc/1000 strokes)                                    | Charge-air<br>pres(mmHg)        | Difference<br>(cc) |                                   |                 |
| End stop                      | 1200<br>600<br>2500<br>2700<br>2900                | 29.0 - 31.0<br>24.8 - 28.8<br>26.7 - 30.7<br>11.4 - 18.4<br>below 6.0 |                                 |                    |                                   |                 |
| Switch off                    | 400  | 0   |                                 |                    |                                   |                 |
| Idle<br>stop                  | 400<br>600   | 7.8 - 11.8<br>below 3.0   |                                 |                    |                                   |                 |
| Partial load                  | 700  | 13.3 - 20.0   |                                 |                    |                                   |                 |
| 2-5<br>Solenoid               | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |   |                                 |                    |                                   |                 |

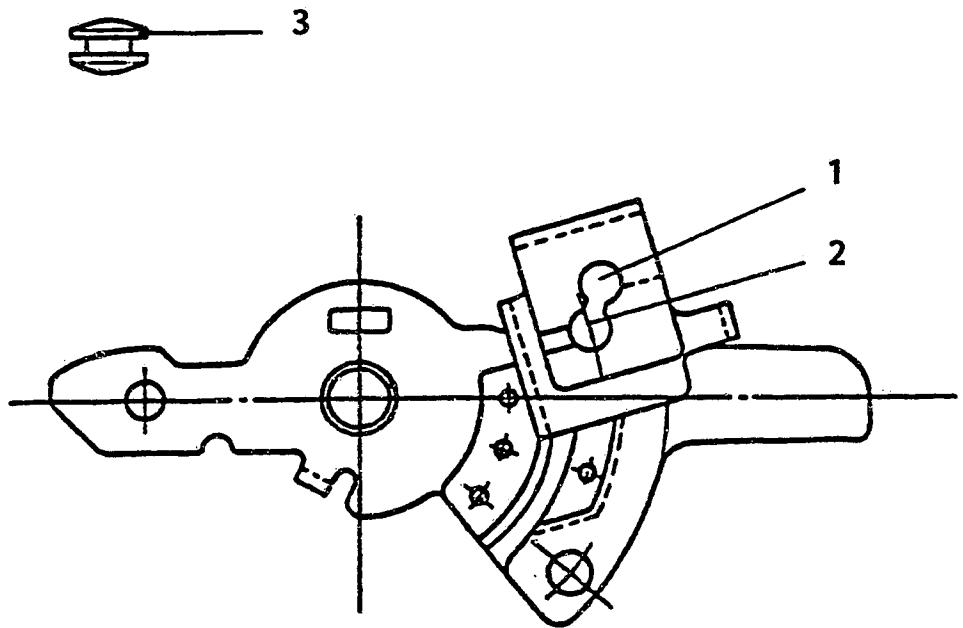
### 3. Dimensions

|         |              |
|---------|--------------|
| K       | 3.2 - 3.4 mm |
| KF      | 5.7 - 5.9 mm |
| MS      | 1.7 - 1.9 mm |
| BCS     | - mm         |
| Pre-st. | - mm         |

### Control lever angle

|          |                 |
|----------|-----------------|
| $\alpha$ | 21° - 29° deg   |
| A        | 2.5 - 8.0 mm    |
| $\beta$  | 37° - 47° deg   |
| B        | 10.7 - 14.8 mm  |
| $\gamma$ | 10.5 - 11.5 deg |
| C        | 6.7 - 7.3 mm    |





104748-2110 2/2

Figure 24

1 = Position A

2 = Position B

3 = Plug

#### ■ Plug Positions

The plug's installation position (shown above) depends on the value of control lever angle  $\beta$ .

**Position A:** When  $37^\circ$  (10.7 mm)  $\leq \beta < 41^\circ$  (12.4 mm)

**Position B:** When  $41^\circ$  (12.4 mm)  $\leq \beta \leq 47^\circ$  (14.8 mm)

**D5**

ZEXEL - Test values

Injection pumps



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: CD17

BOSCH No. 9 460 610 485  
ZEXEL No. 104748-2332  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 16700 16A03

Injection pump no: 104648-2172

(NP-VE4/8F2500LNP134)

Pump rotation: Counter clockwise-viewed from  
drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------|----------------------------|----------------|---------------------------------|-----------------------------------|-----------------|
| 1-1               | Timing device travel       | 1200           | 1.8 - 2.4 (mm)                  |                                   |                 |
| 1-2               | Supply pump pressure       | 1200           | 3.1 - 3.7 (kg/cm <sup>2</sup> ) |                                   |                 |
| 1-3               | Full load delivery         | 1200           | 29.5 - 30.5 (cc/1000st)         |                                   |                 |
|                   | Full load delivery         |                | (cc/1000st)                     |                                   |                 |
| 1-4               | Idle speed regulation      | 400            | 5.3 - 8.3 (cc/1000st)           |                                   |                 |
| 1-5               | Start                      | 100            | 50.0 - 70.0 (cc/1000st)         |                                   |                 |
| 1-6               | Full-load speed regulation | 2700           | 11.9 - 17.9 (cc/1000st)         |                                   |                 |
| 1-7               | Load-timer adjustment      |                |                                 |                                   |                 |
| 1-8               |                            |                |                                 |                                   |                 |

## 2. Test values

|                       |                               |                     |                   |                   |  |
|-----------------------|-------------------------------|---------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 1200<br>1.7 - 2.5   | 1800<br>4.0 - 5.2 | 2500<br>6.8 - 8.0 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 1200<br>3.0 - 3.8   | 1800<br>4.4 - 5.2 | 2500<br>6.1 - 6.9 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 1200<br>36.0 - 38.0 |                   |                   |  |

## 2-4 Fuel injection quantities

| Control lever position | Speed<br>rpm                        | Fuel delivery<br>(cc/1000 strokes)                                    | Charge-air<br>pres(mmHg) | Difference<br>(cc) |
|------------------------|-------------------------------------|---|--------------------------|--------------------|
| End stop               | 1200<br>600<br>2500<br>2700<br>2900 | 29.0 - 31.0<br>24.8 - 28.8<br>26.7 - 30.7<br>11.4 - 18.4<br>below 6.0 |                          |                    |
| Switch off             | 400                                 | 0   |                          |                    |
| Idle<br>stop           | 400<br>600                          | 4.8 - 8.8<br>below 3.0  |                          | 2.5                |
| Partial load           | 700                                 | 10.0 - 20.0   |                          |                    |
| 2-5<br>Solenoid        |                                     | Cut-in voltage max. 8 V<br>Test voltage: 12 V                         |                          |                    |

## 3. Dimensions

|         |              |
|---------|--------------|
| K       | 3.2 - 3.4 mm |
| KF      | 5.7 - 5.9 mm |
| MS      | 1.5 - 1.7 mm |
| BCS     | - mm         |
| Pre-st. | - mm         |

## Control lever angle

|          |                 |
|----------|-----------------|
| $\alpha$ | 1.0 - -1.0 deg  |
| A        | 15.4 - 18.1 mm  |
| $\beta$  | 39.0 - 49.0 deg |
| B        | 11.0 - 16.0 mm  |
| $\gamma$ | 13.5 - 14.5 deg |
| C        | 8.6 - 9.2 mm    |



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: CD17

1/2

BOSCH No. 9 460 610 486  
ZEXEL No. 104748-2342  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 16700 16A08

Injection pump no: 104648-2172

(NP-VE4/8F2500LNP134)

Pump rotation: Counter clockwise-viewed from  
drive side Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------|----------------------------|----------------|---------------------------------|-----------------------------------|-----------------|
| 1-1               | Timing device travel       | 1200           | 1.8 - 2.4 (mm)                  |                                   |                 |
| 1-2               | Supply pump pressure       | 1200           | 3.1 - 3.7 (kg/cm <sup>2</sup> ) |                                   |                 |
| 1-3               | Full load delivery         | 1200           | 29.5 - 30.5 (cc/1000st)         |                                   |                 |
|                   | Full load delivery         |                | (cc/1000st)                     |                                   |                 |
| 1-4               | Idle speed regulation      | 400            | 8.3 - 11.3 (cc/1000st)          |                                   |                 |
| 1-5               | Start                      | 100            | 50.0 - 70.0 (cc/1000st)         |                                   |                 |
| 1-6               | Full-load speed regulation | 2700           | 11.9 - 17.9 (cc/1000st)         |                                   |                 |
| 1-7               | Load-timer adjustment      |                |                                 |                                   |                 |
| 1-8               |                            |                |                                 |                                   |                 |

## 2. Test values

|                       |                               |                     |                   |                   |  |
|-----------------------|-------------------------------|---------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 1200<br>1.7 - 2.5   | 1800<br>4.0 - 5.2 | 2500<br>6.8 - 8.0 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 1200<br>3.0 - 3.8   | 1800<br>4.4 - 5.2 | 2500<br>6.1 - 6.9 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 1200<br>36.0 - 80.0 |                   |                   |  |

## 2-4 Fuel injection quantities

| Control lever position | Speed<br>rpm                                       | Fuel delivery<br>(cc/1000 strokes)                                    | Charge-air<br>pres(mmHg) | Difference<br>(cc) |
|------------------------|--|---|--------------------------|--------------------|
| End stop               | 1200<br>600<br>2500<br>2700<br>2900                | 29.0 - 31.0<br>24.8 - 28.8<br>26.7 - 30.7<br>11.4 - 18.4<br>below 6.0 |                          |                    |
| Switch off             | 400  | 0   |                          |                    |
| Idle<br>stop           | 400<br>600   | 7.8 - 11.8<br>below 3.0   |                          | 2.5                |
| Partial load           | 700  | 13.3 - 20.0   |                          |                    |
| 2-5<br>Solenoid        | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |   |                          |                    |

## 3. Dimensions

|                     |                 |
|---------------------|-----------------|
| K                   | 3.2 - 3.4 mm    |
| KF                  | 5.7 - 5.9 mm    |
| MS                  | 1.5 - 1.7 mm    |
| BCS                 | - mm            |
| Pre-st.             | - mm            |
| Control lever angle |                 |
| α                   | 1.0 - -1.0 deg  |
| A                   | 15.4 - 18.1 mm  |
| β                   | 37.0 - 47.0 deg |
| B                   | 10.7 - 14.8 mm  |
| γ                   | 10.5 - 11.5 deg |
| C                   | 6.7 - 7.3 mm    |



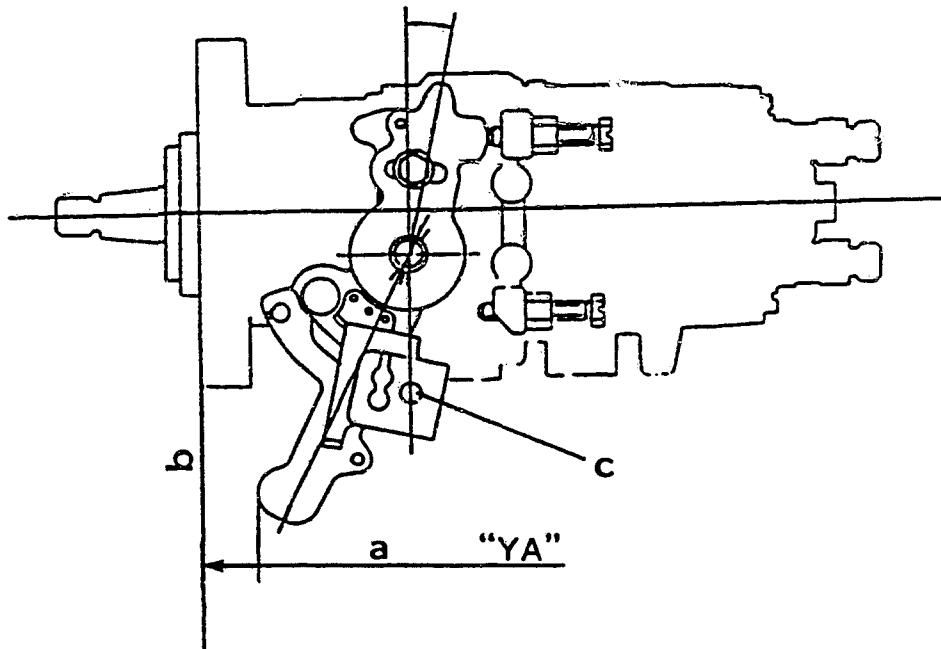


Figure 25

104748-2342 2/2

a = Dimension

b = End face of flange

c = Hole "A"

#### ■ CONTROL LEVER ANGLE MEASUREMENT POSITION

1. Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole "A".

#### 2. Marking Positions

The control lever is marked (painted) at the positions (shown below), depending on the value of control lever angle  $\beta$ .

Position "a": $\Rightarrow$   $\beta \leq 39.5^\circ$  ( $B = 11.7$  mm)

Position "b": $\Rightarrow$   $39.5^\circ < \beta \leq 42.5^\circ$  ( $B = 11.7$  mm)  
 $\qquad\qquad\qquad$  ( $B = 13.0$  mm)

Position "c": $\Rightarrow$   $\beta > 42.5^\circ$  ( $B = 13.0$  mm)

Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: 4FD1

|           |                |
|-----------|----------------|
| BOSCH No. | 9 460 610 476  |
| ZEXEL No. | 104749-6470    |
| Date:     | 30.05.1991 [0] |
| Company:  | ISUZU          |
| No.       | 8944185260     |

Injection pump no: 104649-1720

(NP-VE4/9F2250RNP373)

Pump rotation: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

| 1. Setting values             |  | Speed<br>(rpm)  | Setting values                  |                    | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------------------|--|---|---------------------------------|--------------------|-----------------------------------|-----------------|
| 1-1                           | Timing device travel                               | 1250  | 3.4 - 3.8 (mm)                  |                    |                                   |                 |
| 1-2                           | Supply pump pressure                               | 1250  | 4.6 - 5.0 (kg/cm <sup>2</sup> ) |                    |                                   |                 |
| 1-3                           | Full load delivery                                 | 1250  | 35.3 - 36.3 (cc/1000st)         |                    |                                   | 3.0             |
|                               | Full load delivery                                 |   | (cc/1000st)                     |                    |                                   |                 |
| 1-4                           | Idle speed regulation                              | 340   | 5.6 - 9.6 (cc/1000st)           |                    |                                   | 2.0             |
| 1-5                           | Start  | 100   | 50.0 - 70.0 (cc/1000st)         |                    |                                   |                 |
| 1-6                           | Full-load speed regulation                         | 2600  | 13.1 - 19.1 (cc/1000st)         |                    |                                   | 4.5             |
| 1-7                           | Load-timer adjustment                              |   |                                 |                    |                                   |                 |
| 1-8                           |  |   |                                 |                    |                                   |                 |
| 2. Test values                |  |   |                                 |                    |                                   |                 |
| 2-1                           | Timing device                                      | N = rpm<br>mm   | 1250<br>3.3 - 3.9               | 2000<br>6.3 - 7.5  | 2500<br>8.6 - 9.4                 |                 |
| 2-2                           | Supply pump  | N = rpm<br>kg/cm <sup>2</sup>   | 1250<br>4.6 - 5.0               | 2000<br>6.2 - 6.8  | 2500<br>7.6 - 8.2                 |                 |
| 2-3                           | Overflow delivery                                  | N = rpm<br>cc/10s   | 1250<br>55.0 - 98.0             |                    |                                   |                 |
| 2-4 Fuel injection quantities |  |   |                                 |                    |                                   |                 |
| Control lever position        | Speed<br>rpm                                       | Fuel delivery<br>(cc/1000 strokes)                                    | Charge-air<br>pres(mmHg)        | Difference<br>(cc) |                                   |                 |
| End stop                      | 1250<br>600<br>2250<br>2600<br>2900                | 34.8 - 36.8<br>28.8 - 32.8<br>31.2 - 35.4<br>12.6 - 19.6<br>below 4.5 |                                 |                    |                                   |                 |
| Switch off                    | 340  | 0   |                                 |                    |                                   |                 |
| Idle<br>stop                  | 340<br>450   | 5.6 - 9.6<br>0  |                                 |                    |                                   |                 |
| 2-5<br>Solenoid               | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |   |                                 |                    |                                   |                 |
| 3. Dimensions                 |  |   |                                 |                    |                                   |                 |
| K                             | 3.2 - 3.4 mm                                       |   |                                 |                    |                                   |                 |
| KF                            | 5.7 - 5.9 mm                                       |   |                                 |                    |                                   |                 |
| MS                            | 1.5 - 1.7 mm                                       |   |                                 |                    |                                   |                 |
| BCS                           | - mm   |   |                                 |                    |                                   |                 |
| Pre-st.                       | - mm   |   |                                 |                    |                                   |                 |
| Control lever angle           |  |   |                                 |                    |                                   |                 |
| α                             | -2.0 - 6.0 deg                                     |   |                                 |                    |                                   |                 |
| A                             | 8.5 - 11.1 mm                                      |   |                                 |                    |                                   |                 |
| β                             | 40.0 - 50.0 deg                                    |   |                                 |                    |                                   |                 |
| B                             | 12.8 - 16.1 mm                                     |   |                                 |                    |                                   |                 |
| γ                             | - deg  |   |                                 |                    |                                   |                 |
| C                             | - mm   |   |                                 |                    |                                   |                 |



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: LD28

1/4

BOSCH No. 9 460 610 497  
ZEXEL No. 104769-2074  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 16700 50L15

Injection pump no: 104669-2132

(NP-VE6/9F2500RNP34)

Pump rotation: Clockwise-viewed from drive  
side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------|----------------------------|----------------|---------------------------------|-----------------------------------|-----------------|
| 1-1               | Timing device travel       | 900            | 2.0 - 2.6 (mm)                  |                                   |                 |
| 1-2               | Supply pump pressure       | 900            | 3.5 - 4.1 (kg/cm <sup>2</sup> ) |                                   |                 |
| 1-3               | Full load delivery         | 900            | 29.0 - 30.0 (cc/1000st)         |                                   |                 |
|                   | Full load delivery         |                | (cc/1000st)                     |                                   | 2.5             |
| 1-4               | Idle speed regulation      | 350            | 6.3 - 9.3 (cc/1000st)           |                                   |                 |
| 1-5               | Start                      | 100            | 40.8 - 48.8 (cc/1000st)         |                                   |                 |
| 1-6               | Full-load speed regulation | 2600           | 15.5 - 21.5 (cc/1000st)         |                                   |                 |
| 1-7               | Load-timer adjustment      | 900            | T = 0.2-0.8 (mm)                |                                   |                 |
| 1-8               |                            |                |                                 |                                   |                 |

## 2. Test values

|                       |                               |                    |                   |                   |  |
|-----------------------|-------------------------------|--------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 900<br>1.9 - 2.7   | 1200<br>3.5 - 4.7 | 2300<br>8.1 - 9.0 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 900<br>3.4 - 4.2   | 1800<br>5.5 - 6.3 | 2500<br>7.2 - 8.0 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 900<br>43.0 - 87.0 |                   |                   |  |

## 2-4 Fuel injection quantities

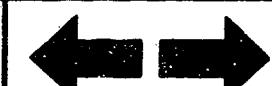
| Control lever position | Speed<br>rpm                       | Fuel delivery<br>(cc/1000 strokes)                                    | Charge-air<br>pres(mmHg) | Difference<br>(cc) |
|------------------------|------------------------------------|---|--------------------------|--------------------|
| End stop               | 900<br>600<br>2300<br>2600<br>2800 | 28.5 - 30.5<br>27.0 - 31.0<br>28.8 - 32.8<br>15.0 - 22.0<br>below 5.0 |                          |                    |
| Switch off             | 350                                | 0   |                          |                    |
| Idle<br>stop           | 350<br>500                         | 5.8 - 9.8<br>below 4.0  |                          | 2.2                |
| Partial load           | 900                                | 2.1 - 12.1  |                          |                    |
| 2-5<br>Solenoid        |                                    | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V                    |                          |                    |

## 3. Dimensions

|         |                |
|---------|----------------|
| K       | 3.2 - 3.4 mm   |
| KF      | 6.54 - 6.74 mm |
| MS      | 1.7 - 1.9 mm   |
| BCS     | - mm           |
| Pre-st. | - mm           |

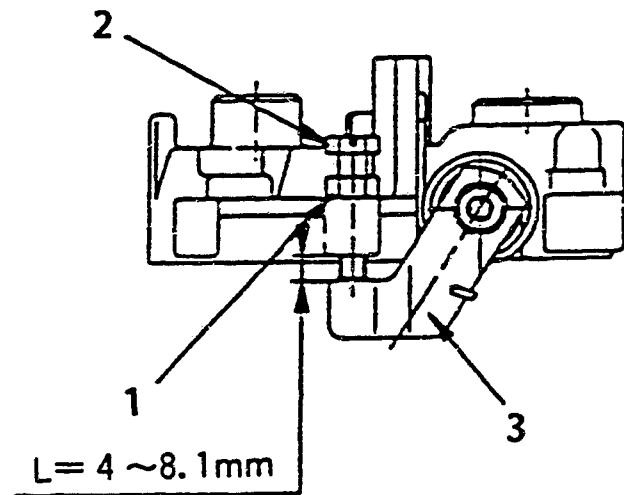
## Control lever angle

|          |                 |
|----------|-----------------|
| $\alpha$ | 21° - 29° deg   |
| A        | 5.7 - 9.5 mm    |
| $\beta$  | 39° - 49° deg   |
| B        | 11.0 - 16.0 mm  |
| $\gamma$ | 10.5 - 11.5 deg |
| C        | 4.8 - 5.2 mm    |



### ■ STARTING INJECTION QUANTITY ADJUSTMENT

Adjust the starting injection quantity (page 1/4) using the adjusting bolt (as shown in the figure at right).



### ■ LOAD TIMER ADJUSTMENT

#### 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: - mmHg  
 Pump Speed : 900 rpm  
 Fuel Injection Quantity: 8.0 - 10.0 cc/1000st

Figure 26

1 = Locknut  
 2 = Adjusting bolt  
 3 = Stop lever

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (page 1/4).

## ■ W-CSD ADJUSTMENT

## 1. Timer Stroke Adjustment (adjust to the thick line)

- 1) Calculate the timer stroke from Fig. 29 (diagram) according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the timer stroke adjusting screw (1) so that the timer stroke is as calculated in item 1.

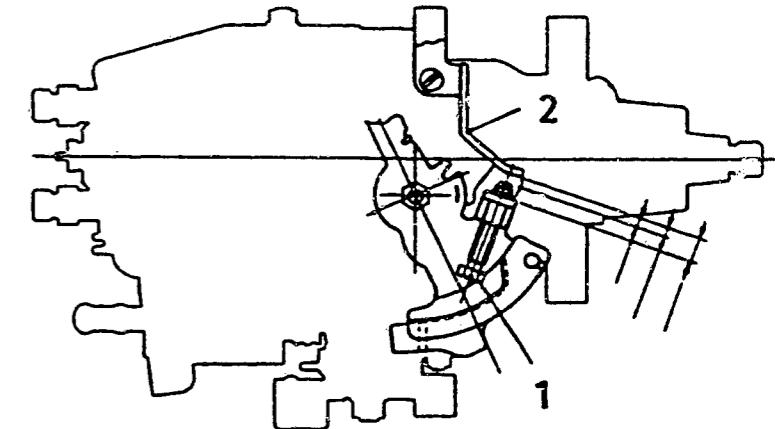


Figure 27

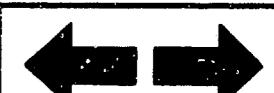
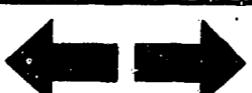
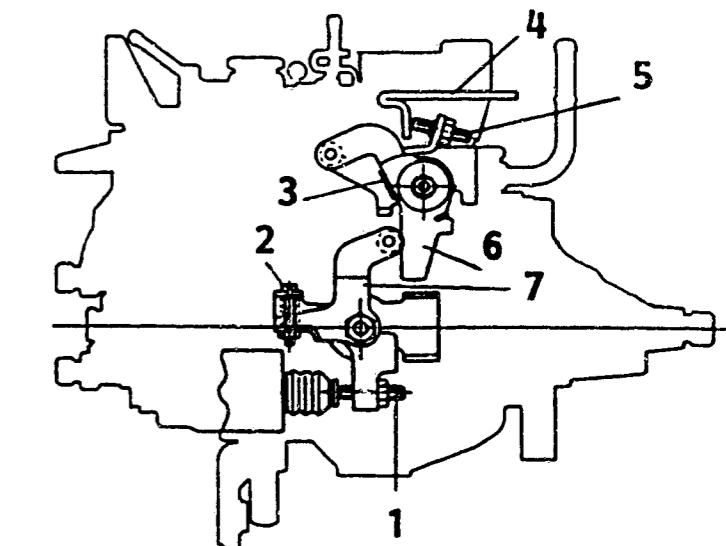
1 = Idling stopper bolt  
2 = Braket

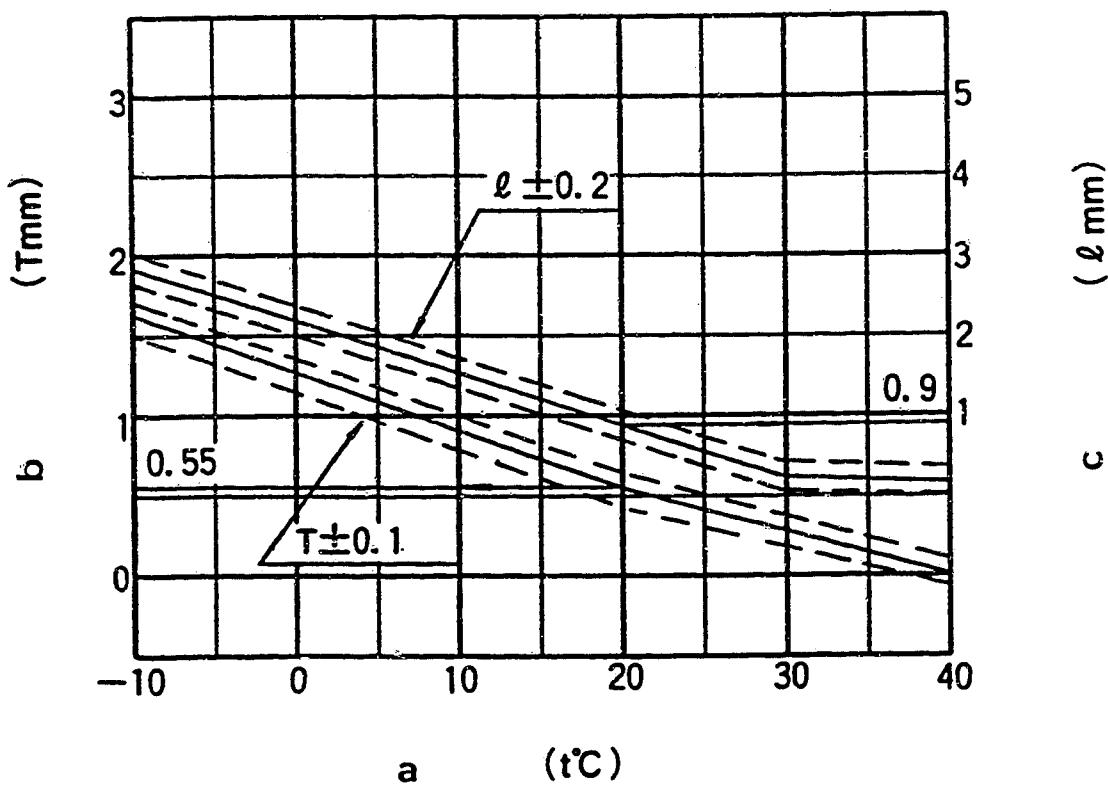
## 2. Intermediate Lever Position Adjustment

- 1) Insert a block gauge (thickness gauge) of  $0.9 \pm 0.05$  mm thickness between the control lever and the idling stopper bolt.
- 2) Align the intermediate lever with the aligning mark.
- 3) Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.

Figure 28

1 = Timer stroke adjusting screw  
2 = Idling adjusting bolt  
3 = Aligning mark  
4 = Control lever  
5 = Intermediate lever set screw  
6 = Intermediate lever  
7 = CSD lever





104769-2074 4/4

Figure 29

**a** = Atmospheric temperature  
**b** = Timer stroke  
**c** = Gap between control lever  
 and idling stopper bolt

### 3. CSD Lever Adjustment (adjust to the thick line)

- 1) Calculate the block gauge dimension  $l \pm 0.05$  mm from (Fig. 29) according to the atmospheric temperature at the time of adjustment.
- 2) Insert the block gauge (thickness gauge) between the control lever and the idling stopper bolt.
- 3) Using the idling bolt, adjust so that the CSD lever roller and the intermediate lever are in contact.

(Continued)

## 4. Final adjustment

After completing the adjustment, screw the timer stroke adjusting screw two turns clockwise.  
(Move from the temporary adjustment chart to the final adjustment chart).

\* This W-CSD's timer stroke operations are effective at atmospheric temperatures of 30°C or above. Therefore, to make adjustment at normal temperatures possible, after adjusting to the substitute characteristics, tighten the timer stroke adjusting screw two turns.

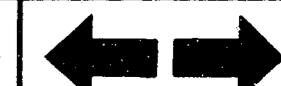
**Note:**

1. The temperature of the wax must be below 30°C when adjusting.
2. When inserting a block gauge (thickness gauge) between the control lever (bracket) and the idling stopper bolt, use the idling adjusting bolt to separate the CSD lever and the intermediate lever so that no excessive force is exerted on them.

$$-10 \leq \theta \text{ (}^{\circ}\text{C)} \leq 20 \quad TA = -0.0367 \theta + 1.284 \quad -10 \leq \theta \text{ (}^{\circ}\text{C)} \leq 20 \quad l = -0.0628 \theta + 2.1555$$

$$20 \leq \theta \text{ (}^{\circ}\text{C)} \leq 40 \quad TA = -0.0275 \theta + 1.1 \quad 20 \leq \theta \text{ (}^{\circ}\text{C)} \leq 30 \quad l = -0.0507 \theta + 1.9142$$

$$30 \leq \theta \text{ (}^{\circ}\text{C)} \leq 50 \quad l = -0.0196 \theta + 0.9809$$

**D20**ZEXEL - Test values  
Injection pumps**D21**ZEXEL - Test values  
Injection pumps

Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: RD28-T

BOSCH No. 9 460 610 488  
ZEXEL No. 104769-2162  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 16700 22J10

Injection pump no.: 104669-2162

(NP-VE6/9F2300RNP58)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:

1 688 901 000

Test pressure line:

1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  |  | Charge-air pressure<br>bar (mmHg) | Difference<br>(cc) |
|-------------------|----------------------------|----------------|---------------------------------|--|-----------------------------------|--------------------|
| 1-1               | Timing device travel       | 900            | 1.1 - 1.5 (mm)                  |  | 342 - 362                         |                    |
| 1-2               | Supply pump pressure       | 900            | 3.5 - 4.1 (kg/cm <sup>2</sup> ) |  | 342 - 362                         |                    |
| 1-3               | Full load delivery         | 600            | 31.3 - 32.1 (cc/1000st)         |  | 0                                 | 2.0                |
|                   | Full load delivery         | 900            | 38.6 - 39.4 (cc/1000st)         |  | 240 - 260                         | 2.0                |
| 1-4               | Idle speed regulation      | 350            | 6.6 - 8.6 (cc/1000st)           |  | 0                                 | 0.9                |
| 1-5               | Start                      | 100            | above 38.0 (cc/1000st)          |  | 0                                 |                    |
| 1-6               | Full-load speed regulation | 2350           | 35.3 - 37.3 (cc/1000st)         |  | 470 - 490                         | 4.5                |
| 1-7               | Load-timer adjustment      |                |                                 |  |                                   |                    |

## 2. Test values

|                       |                               |                  |                 |                 |                 |  |
|-----------------------|-------------------------------|------------------|-----------------|-----------------|-----------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 900<br>1.1-1.5   | 1800<br>4.3-5.4 | 2300<br>6.3-7.4 | 2500<br>6.5-7.4 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 900<br>3.5-4.1   | 1800<br>5.6-6.2 | 2300<br>6.9-7.5 |                 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 900<br>43.0-87.0 |                 |                 |                 |  |

## 2-4 Fuel injection quantities

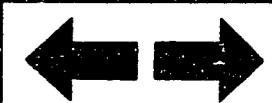
| Speed control lever pos. | Speed<br>(rpm)                                     | Fuel delivery<br>(cc/1000st) | Charge-air<br>pres(mmHg) | Difference<br>(cc) |
|--------------------------|--|------------------------------|--------------------------|--------------------|
| End stop                 | 900  | 38.1 - 39.9                  | 240 - 260                |                    |
|                          | 600  | 30.8 - 32.6                  | 0                        |                    |
|                          | 1200   | 42.0 - 46.0                  | 470 - 490                |                    |
|                          | 1800   | 41.2 - 45.2                  | 470 - 490                |                    |
|                          | 2200   | 40.5 - 46.5                  | 470 - 490                |                    |
|                          | 2300   | 37.8 - 44.8                  | 470 - 490                |                    |
|                          | 2350   | 34.8 - 37.8                  | 470 - 490                |                    |
|                          | 2500   | 14.0 - 24.0                  | 470 - 490                |                    |
|                          | 2800   | below 3.0                    | 470 - 490                |                    |
| Switch off               | 350  | 0                            | 0                        |                    |
|                          | 900  | 0                            | 342 - 362                |                    |
| Idle-<br>stop            | 350  | 6.6 - 8.6                    | 0                        |                    |
|                          | 500  | below 3.0                    | 0                        |                    |
| Partial load             | 900  | 6.6 - 12.6                   | 0                        |                    |
| 2-5<br>Solenoid          | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |                              |                          |                    |

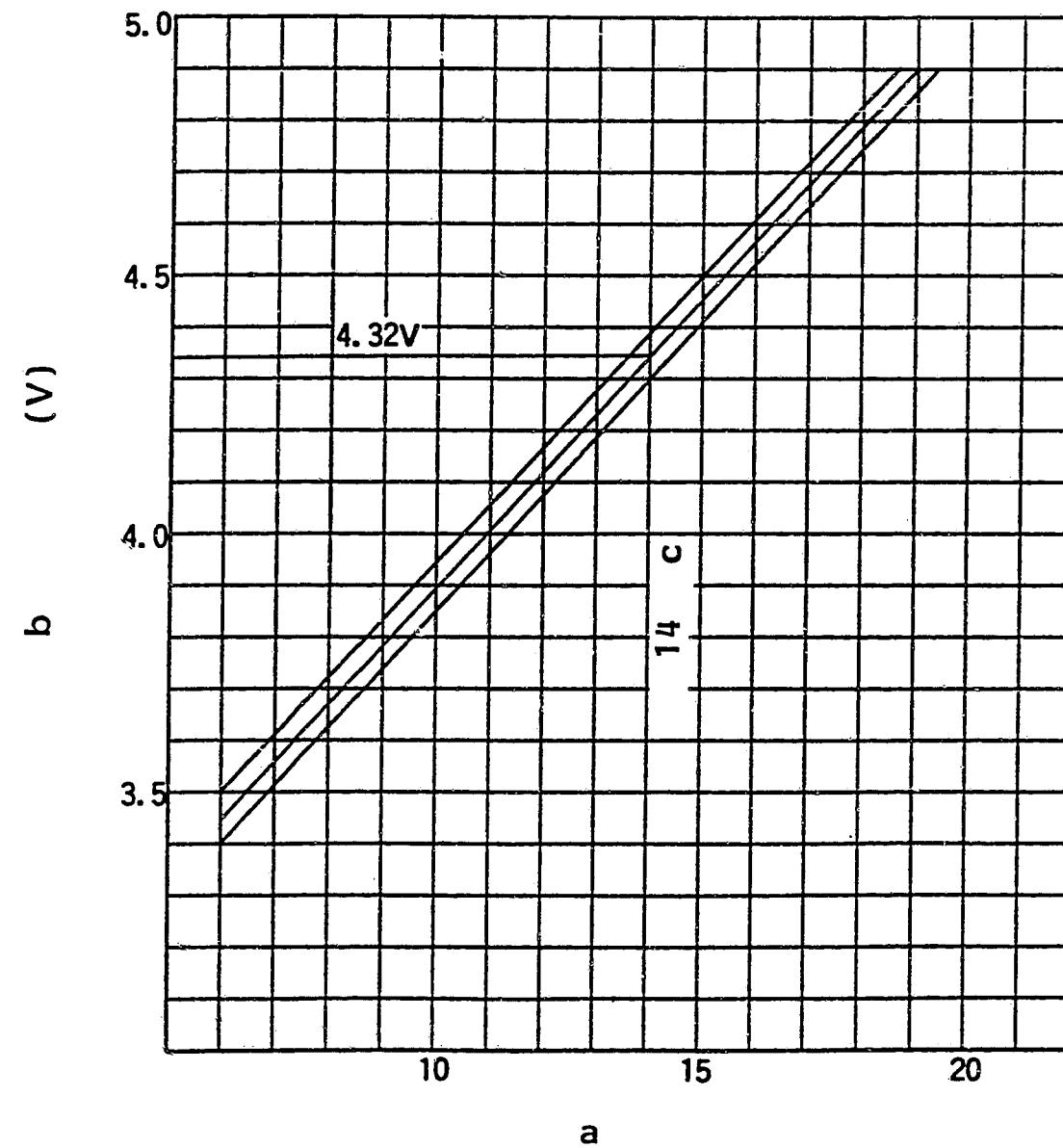
## 3. Dimensions

|         |                |
|---------|----------------|
| K       | 3.2 - 3.4 mm   |
| KF      | 6.54 - 6.74 mm |
| MS      | 1.7 - 1.9 mm   |
| BCS     | 3.8 - 4.0 mm   |
| Pre-st. | - mm           |

## Control lever angle

|          |                 |
|----------|-----------------|
| $\alpha$ | 19 - 27° deg    |
| A        | 8.7 - 12.9 mm   |
| $\beta$  | 37 - 47° deg    |
| B        | 11.5 - 15.2 mm  |
| $\gamma$ | 10.5 - 11.5°deg |
| C        | 5.7 - 6.3 mm    |





■ POTENTIOMETER ADJUSTMENT

Fig. 30

104769-2162 2/4

a = Fuel injection quantity ( $\text{cm}^3/1000\text{st}$ )  
 b = Out-put voltage  
 c =  $\text{cm}^3/1000\text{st}$

E3

ZEXEL - Test values  
Injection pumps



E4

ZEXEL - Test values  
Injection pumps



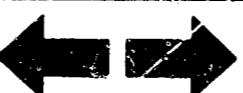
Under the following conditions, alter the potentiometer's installation position so that the out-put voltage equals the specified value.

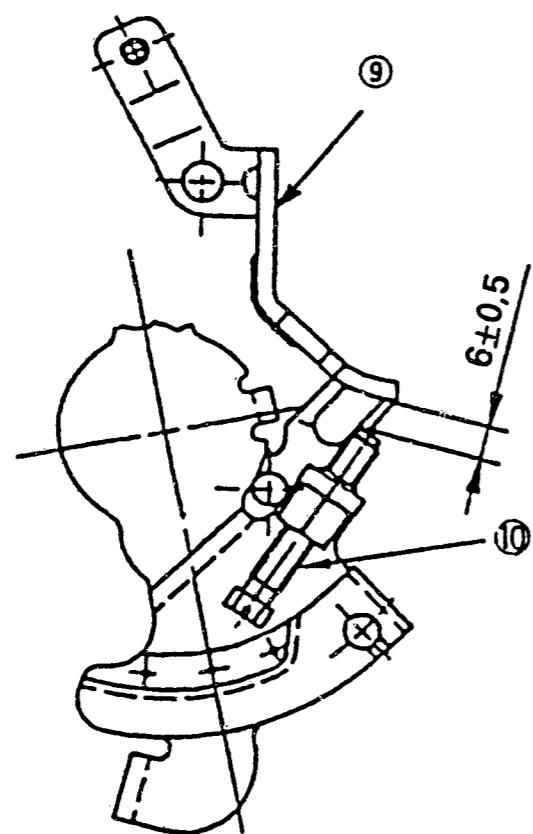
| Adjustment Conditions  |                  |                                     | Specified Value     | Remarks       |
|------------------------|------------------|-------------------------------------|---------------------|---------------|
| Control lever position | Pump speed (rpm) | Fuel injection quantity (cc/1000st) | Out-put voltage (V) |               |
| (Approx. 15.5°)        | 1200             | Measure                             | Measure             | Adjust. point |
| Idle                   | -                | -                                   | -                   | Check point   |
| Full speed             | -                | -                                   | -                   | Check point   |

(In-put voltage: 10V)

\* A control lever position of approx. 15.5°, means that a block gauge of 8.4 mm thickness is inserted between the control lever and the idling stopper bolt.

$$V \pm 0.05 = 0.1115 Q + 2.7557 \text{ (V)}$$





9 = Idling set bracket

#### ■ M-CSD ADJUSTMENT

##### 1. CSD Adjustment

- 1) Hold the control lever (6) in the idling position.
- 2) Move the CSD lever (5) to the right until it contacts the stopper (4).
- 3) Then, adjust the position of the screw (2) so that the timer stroke is  $1.6 \pm 0.2$  mm and fix the screw (2) using the nut.

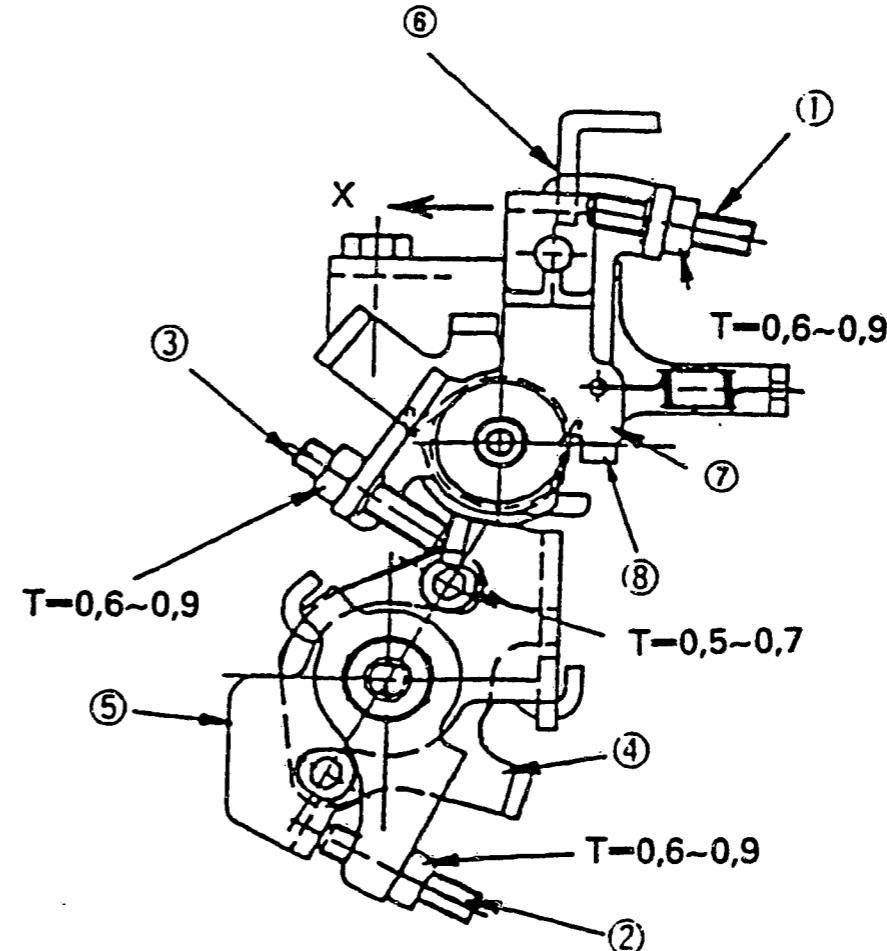


Fig. 31

104769-2162 3/4

(Continued)

## 2. Fixing the Intermediate Lever Adjustment Screw

- 1) Hold the CSD lever (5) in the position described in item 1 (timer stroke:  $1.6 \pm 0.2$  mm).
- 2) Move the intermediate lever (7) toward "X" and confirm that it contacts the stopper (8).
- 3) Then, adjust the screw (3) so that the CSD lever (5) contacts the screw (3) and fix the screw (3) using the nut.
- 4) Return the intermediate lever (7) to its original position and confirm that the timer stroke is 0 mm.

## 3. Screw (1) Adjustment

- 1) Move the intermediate lever (7) toward "X" until it contacts the stopper (8).
- 2) Adjust the position of the screw (1) so that the gap between the idling set bracket (9) and screw (10) is  $6 \pm 0.5$  mm, and fix screw (1) using the nut.
- 3) Then, confirm that the gap between the control lever (6) and screw (1) is approximately 1.7 mm.



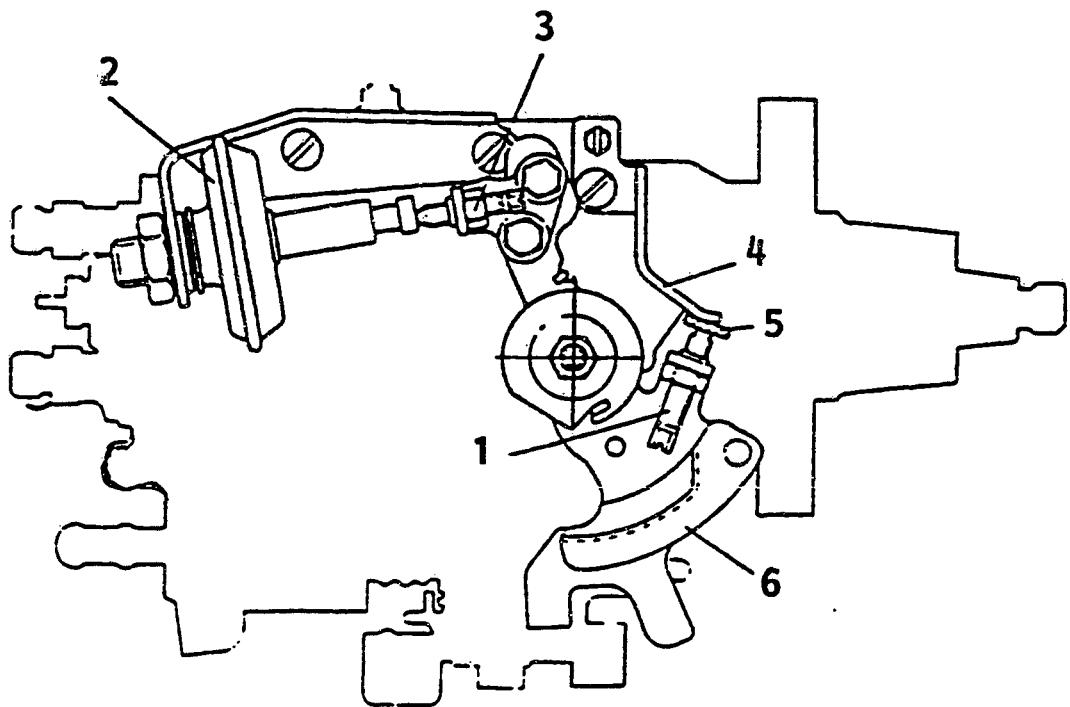


Figure 32

104769-2162 4/4

1 = Idling stopper bolt  
 2 = Dash pot  
 3 = Dash pot adjusting screw

4 = Bracket  
 5 = Block gauge  
 6 = Control lever

#### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $3.8 \pm 0.05$  mm in the gap between the idling stopper bolt and the bracket.
2. With the control lever positioned as described in 1. above, adjust the dashpot adjusting screw so that the dashpot adjusting screw and the pushrod are in contact.  
Fix the screw using the nut.

Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: RD28

1/3

BOSCH No. 9 460 610 454  
ZEXEL No. 104769-2174  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 16700 C9601

Injection pump no: 104669-2174

(NP-VE6/9F2500RNP59)

Pump rotation: Clockwise-viewed from drive  
side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  | Charge-air pressure<br>bar (mmHg) | Difference (cc) |
|-------------------|----------------------------|----------------|---------------------------------|-----------------------------------|-----------------|
| 1-1               | Timing device travel       | 1200           | 2.0 - 2.4 (mm)                  |                                   |                 |
| 1-2               | Supply pump pressure       | 1200           | 4.2 - 4.8 (kg/cm <sup>2</sup> ) |                                   |                 |
| 1-3               | Full load delivery         | 900            | 29.0 - 30.0 (cc/1000st)         |                                   | 2.5             |
|                   | Full load delivery         |                | (cc/1000st)                     |                                   |                 |
| 1-4               | Idle speed regulation      | 350            | 5.8 - 8.8 (cc/1000st)           |                                   | 1.4             |
| 1-5               | Start                      | 100            | above 38.0 (cc/1000st)          |                                   | 20.0            |
| 1-6               | Full-load speed regulation | 2600           | 15.5 - 21.5 (cc/1000st)         |                                   | 5.0             |
| 1-7               | Load-timer adjustment      |                |                                 |                                   |                 |

#### 2. Test values

|                       |                               |                     |                   |                   |  |
|-----------------------|-------------------------------|---------------------|-------------------|-------------------|--|
| 2-1 Timing device     | N = rpm<br>mm                 | 900<br>1.9 - 2.5    | 1800<br>4.9 - 5.7 | 2500<br>7.3 - 8.2 |  |
| 2-2 Supply pump       | N = rpm<br>kg/cm <sup>2</sup> | 1200<br>4.1 - 4.9   | 1800<br>5.5 - 6.3 | 2500<br>7.2 - 8.0 |  |
| 2-3 Overflow delivery | N = rpm<br>cc/10s             | 1200<br>48.0 - 92.0 |                   |                   |  |

#### 2-4 Fuel injection quantities

| Control lever position | Speed<br>rpm                                       | Fuel delivery<br>(cc/1000 strokes)                                    | Charge-air<br>pres(mmHg) | Difference<br>(cc) |
|------------------------|--|---|--------------------------|--------------------|
| End stop               | 900<br>600<br>2300<br>2600<br>2800                 | 28.5 - 30.5<br>27.1 - 31.1<br>26.8 - 30.8<br>15.0 - 22.0<br>below 5.0 |                          |                    |
| Switch off             | 350<br>900   | 0<br>0  |                          |                    |
| Idle<br>stop           | 350<br>500   | 5.3 - 9.3<br>below 4.0  |                          |                    |
| 2-5<br>Solenoid        | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V |   |                          |                    |

#### 3. Dimensions

|         |                |
|---------|----------------|
| K       | 3.2 - 3.4 mm   |
| KF      | 6.54 - 6.74 mm |
| MS      | 1.7 - 1.9 mm   |
| BCS     | - mm           |
| Pre-st. | - mm           |

#### Control lever angle

|          |                 |
|----------|-----------------|
| $\alpha$ | 19° - 27° deg   |
| A        | 8.7 - 12.9 mm   |
| $\beta$  | 37° - 47° deg   |
| B        | 11.5 - 15.2 mm  |
| $\gamma$ | 10.5 - 11.5 deg |
| C        | 5.7 - 6.3 mm    |



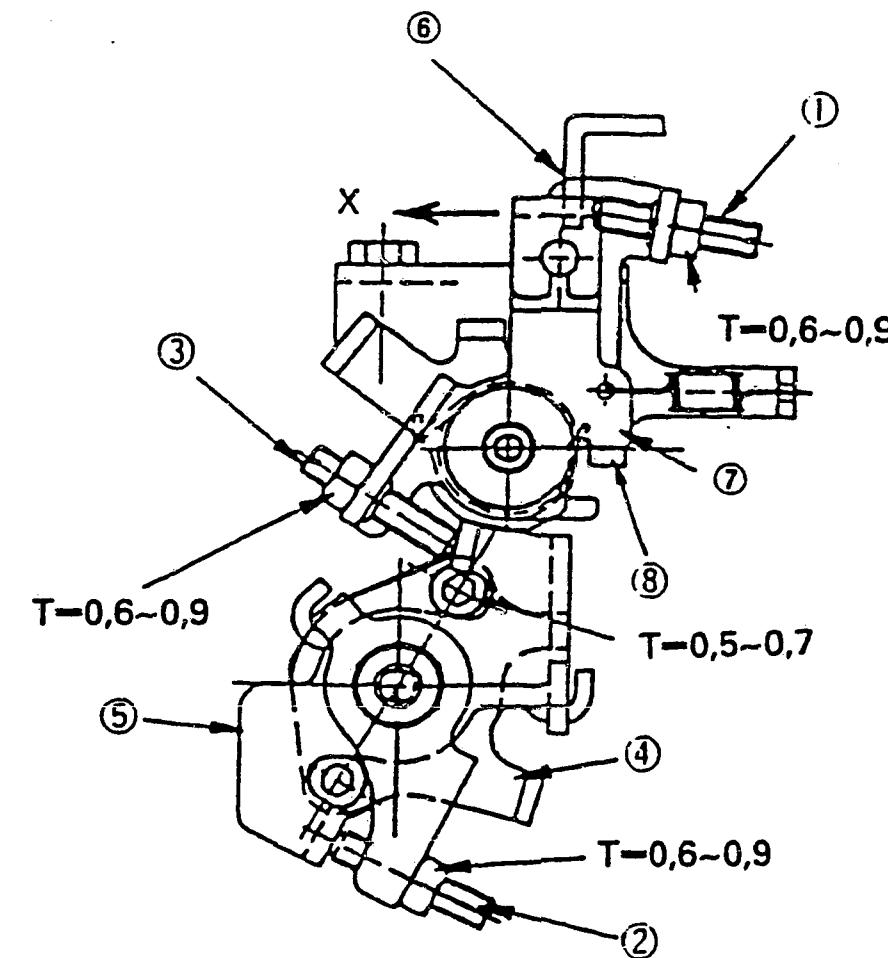
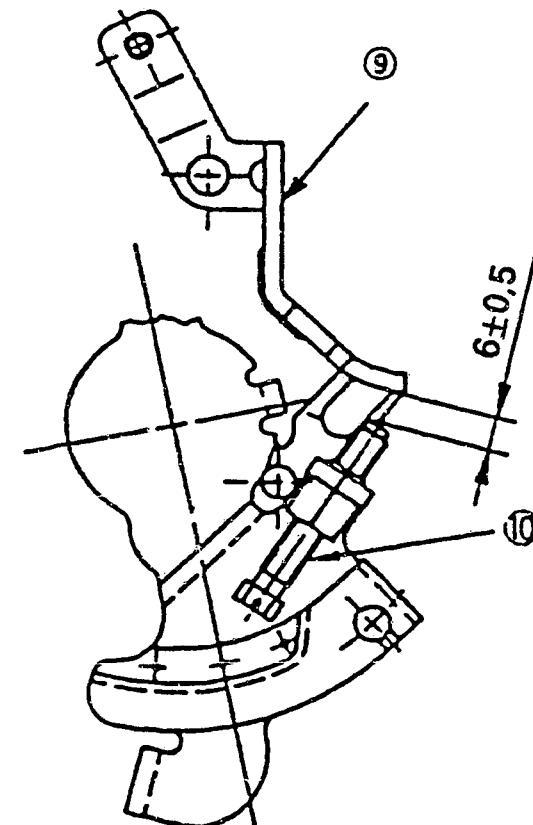


Fig. 33

104769-2174 2/3

9 = Idling set bracket

6 = Control lever

7 = Intermediate lever

#### ■ M-CSD ADJUSTMENT

##### 1. CSD Adjustment

- 1) Hold the control lever (6) in the idling position.
- 2) Move the CSD lever (5) to the right until it contacts the stopper (4).
- 3) Then, adjust the position of the screw (2) so that the timer stroke is  $1.6 \pm 0.2$  mm and fix the screw (2) using the nut.

(Continued)

## 2. Fixing the Intermediate Lever Adjustment Screw

- 1) Hold the CSD lever (5) in the position described in item 1 (timer stroke:  $1.6 \pm 0.2$  mm).
- 2) Move the intermediate lever (7) toward "X" and confirm that it contacts the stopper (8).
- 3) Then, adjust the screw (3) so that the CSD lever (5) contacts the screw (3) and fix the screw (3) using the nut.
- 4) Return the intermediate lever (7) to its original position and confirm that the timer stroke is 0 mm.

## 3. Screw (1) Adjustment

- 1) Move the intermediate lever (7) toward "X" until it contacts the stopper (8).
- 2) Adjust the position of the screw (1) so that the gap between the idling set bracket (9) and screw (10) is  $6 \pm 0.5$  mm, and fix screw (1) using the nut.
- 3) Then, confirm that the gap between the control lever (6) and screw (1) is approximately 1.7 mm.



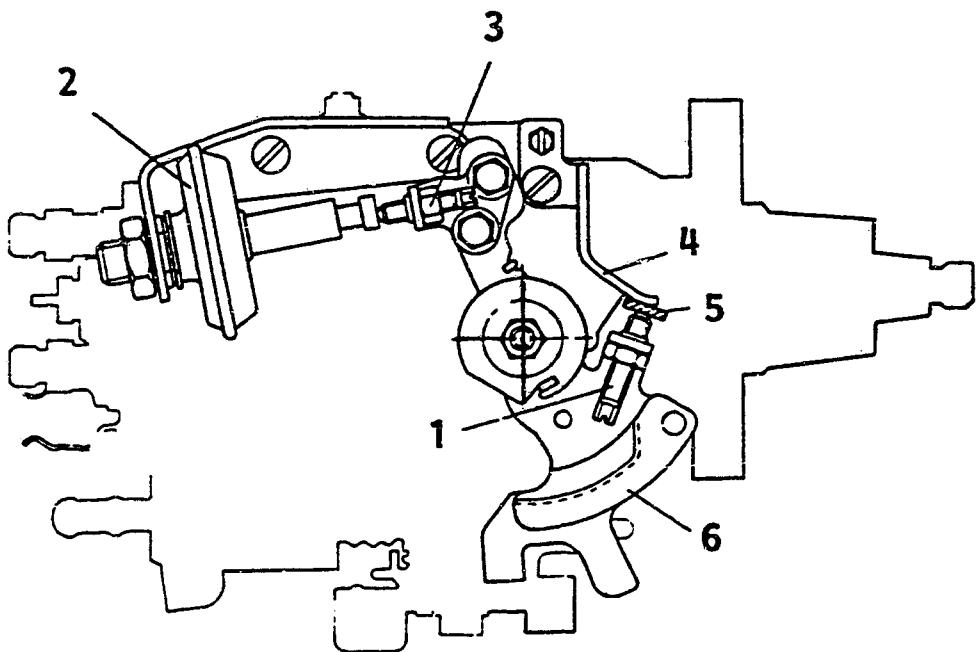


Figure 34

104769-2174 3/3

- 1 = Idling stopper bolt
- 2 = Dash pot
- 3 = Dash pot adjusting screw
- 4 = Bracket
- 5 = Block gauge
- 6 = Control lever

#### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $2.7 \pm 0.05$  mm in the gap between the idling stopper bolt and the bracket.

(Continued)

2. With the control lever positioned as described in 1. above, adjust the dashpot adjusting screw so that the dashpot adjusting screw and the pushrod are in contact.  
Fix the screw using the nut.

**Caution:**

- The adjusting screw and the pushrod must move together smoothly.
- Confirm that the control lever returns to the idling position.



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: RD28-T

BOSCH No. 9 460 610 487  
ZEXEL No. 104769-2180  
Date: 30.05.1991 [0]  
Company: NISSAN  
No. 16700 22J01

Injection pump no.: 104669-2152

(NP-VE6/9F2300RNP57)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:

1 688 901 022

Test pressure line:

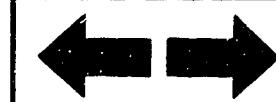
1 680 750 073

| 1. Setting values |                            | Speed<br>(rpm) | Setting values                  |  | Charge-air pressure<br>bar (mmHg) | Difference<br>(cc) |
|-------------------|----------------------------|----------------|---------------------------------|--|-----------------------------------|--------------------|
| 1-1               | Timing device travel       | 900            | 1.1 - 1.5 (mm)                  |  | 342 - 362                         |                    |
| 1-2               | Supply pump pressure       | 900            | 3.5 - 4.1 (kg/cm <sup>2</sup> ) |  | 342 - 362                         |                    |
| 1-3               | Full load delivery         | 600 (Full)     | 31.3 - 32.1 (cc/1000st)         |  | 0                                 | 2.0                |
|                   | Full load delivery         | 900 (BCS)      | 38.6 - 39.4 (cc/1000st)         |  | 240 - 260                         | 2.0                |
| 1-4               | Idle speed regulation      | 350            | 6.6 - 8.6 (cc/1000st)           |  | 0                                 | 0.9                |
| 1-5               | Start                      | 100            | above 38.0 (cc/1000st)          |  | 0                                 |                    |
| 1-6               | Full-load speed regulation | 2350           | 34.8 - 36.8 (cc/1000st)         |  | 470 - 490                         | 4.5                |
| 1-7               | Load-timer adjustment      |                |                                 |  |                                   |                    |

## 2. Test values

|                               |                               |                  |                 |                 |                 |  |
|-------------------------------|-------------------------------|------------------|-----------------|-----------------|-----------------|--|
| 2-1 Timing device             | N = rpm<br>mm                 | 900<br>1.0-1.6   | 1800<br>4.1-5.7 | 2300<br>6.1-7.4 | 2500<br>6.4-7.4 |  |
| 2-2 Supply pump               | N = rpm<br>kg/cm <sup>2</sup> | 900<br>3.5-4.1   | 1800<br>5.6-6.2 | 2300<br>6.9-7.5 |                 |  |
| 2-3 Overflow delivery         | N = rpm<br>cc/10s             | 900<br>43.0-87.0 |                 |                 |                 |  |
| 2-4 Fuel injection quantities |                               |                  |                 |                 |                 |  |

| Speed control lever pos. | Speed<br>(rpm)  | Fuel delivery<br>(cc/1000st)   | Charge-air<br>pres (mmHg)  | Difference<br>(cc) | 3. Dimensions   |
|--------------------------|---|--|--|--------------------|---|
| End stop                 | 600 (Full)<br>900 (BCS)<br>1200<br>1800<br>2200<br>2300<br>2400<br>2700 | 30.7 - 32.7<br>38.0 - 40.0<br>41.9 - 45.9<br>40.8 - 44.8<br>39.5 - 45.5<br>34.3 - 37.3<br>22.4 - 32.4<br>below 3.0 | 0<br>240 - 260<br>470 - 490<br>470 - 490<br>470 - 490<br>470 - 490<br>470 - 490<br>470 - 490 |                    | K 3.2 - 3.4 mm<br>KF 6.54 - 6.74 mm<br>MS 1.7 - 1.9 mm<br>BCS 3.8 - 4.0 mm<br>Pre.st. - mm  |
| Switch off               | 900 (Full)<br>350 (Idle)  | 0<br>0   | 342 - 362<br>-   |                    | Control lever angle   |
| Idle-<br>stop            | 500<br>350  | below 3.0<br>6.6 - 8.6   | 0<br>0   |                    | $\alpha$ 19 - 27° deg<br>$A$ 8.7 - 12.6 mm<br>$\beta$ 34 - 44° deg<br>$B$ 10.5 - 14.2 mm<br>$\gamma$ 15 - 16° deg<br>$C$ 7.9 - 9.5 mm |
| 2-5<br>Solenoid          | Cut-in voltage max. 8 V<br>Test voltage: 12 - 14 V                      |  |  |                    |   |



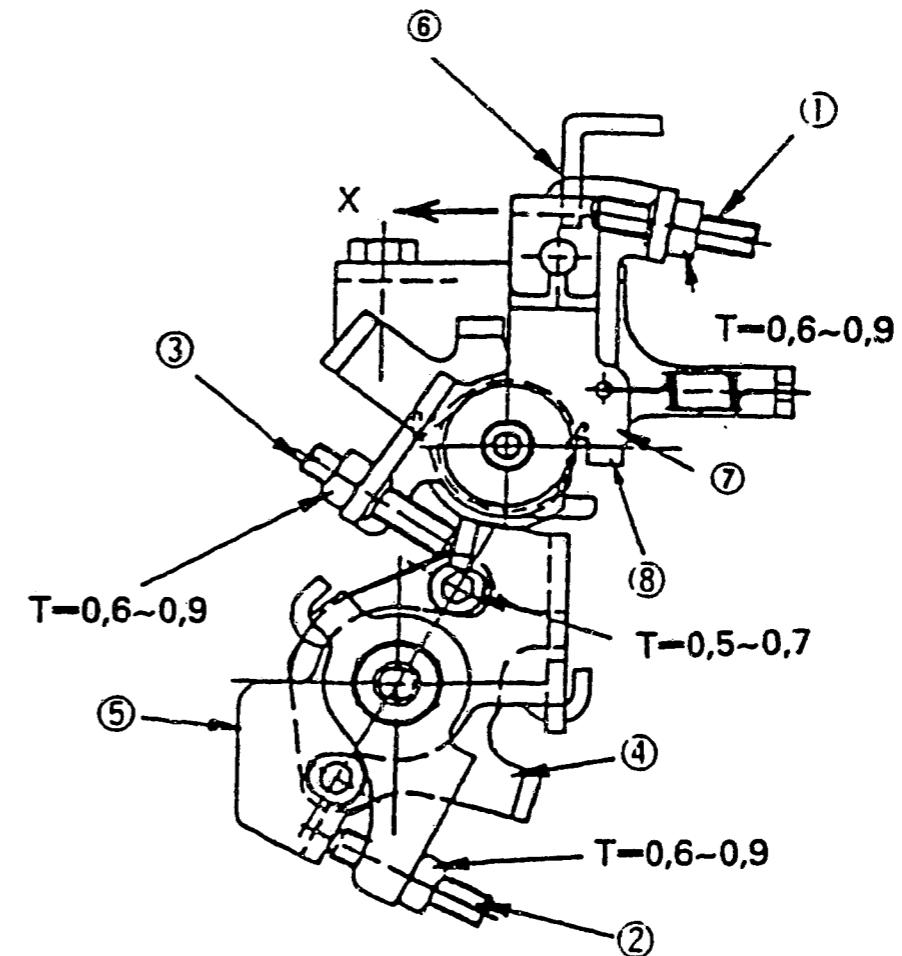
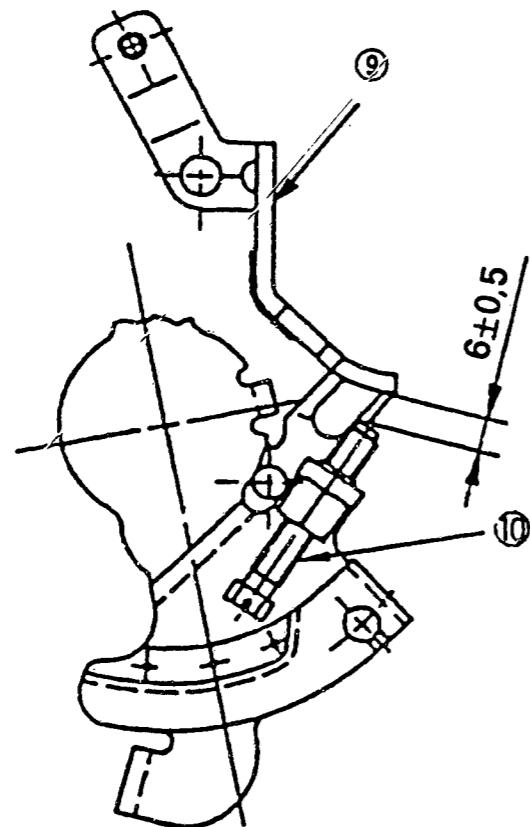


Fig. 35

104769-2180 2/3

9 = Idling set bracket

6 = Control lever

7 = Intermediate lever

#### ■ M-CSD ADJUSTMENT

##### 1. CSD Adjustment

- 1) Hold the control lever (6) in the idling position.
- 2) Move the CSD lever (5) to the right until it contacts the stopper (4).
- 3) Then, adjust the position of the screw (2) so that the timer stroke is  $1.6 \pm 0.2$  mm and fix the screw (2) using the nut.

(Continued)

## 2. Fixing the Intermediate Lever Adjustment Screw

- 1) Hold the CSD lever (5) in the position described in item 1 (timer stroke:  $1.6 \pm 0.2$  mm).
- 2) Move the intermediate lever (7) toward "X" and confirm that it contacts the stopper (8).
- 3) Then, adjust the screw (3) so that the CSD lever (5) contacts the screw (3) and fix the screw (3) using the nut.
- 4) Return the intermediate lever (7) to its original position and confirm that the timer stroke is 0 mm.

## 3. Screw (1) Adjustment

- 1) Move the intermediate lever (7) toward "X" until it contacts the stopper (8).
- 2) Adjust the position of the screw (1) so that the gap between the idling set bracket (9) and screw (10) is  $6 \pm 0.5$  mm, and fix screw (1) using the nut.
- 3) Then, confirm that the gap between the control lever (6) and screw (1) is approximately 1.7 mm.



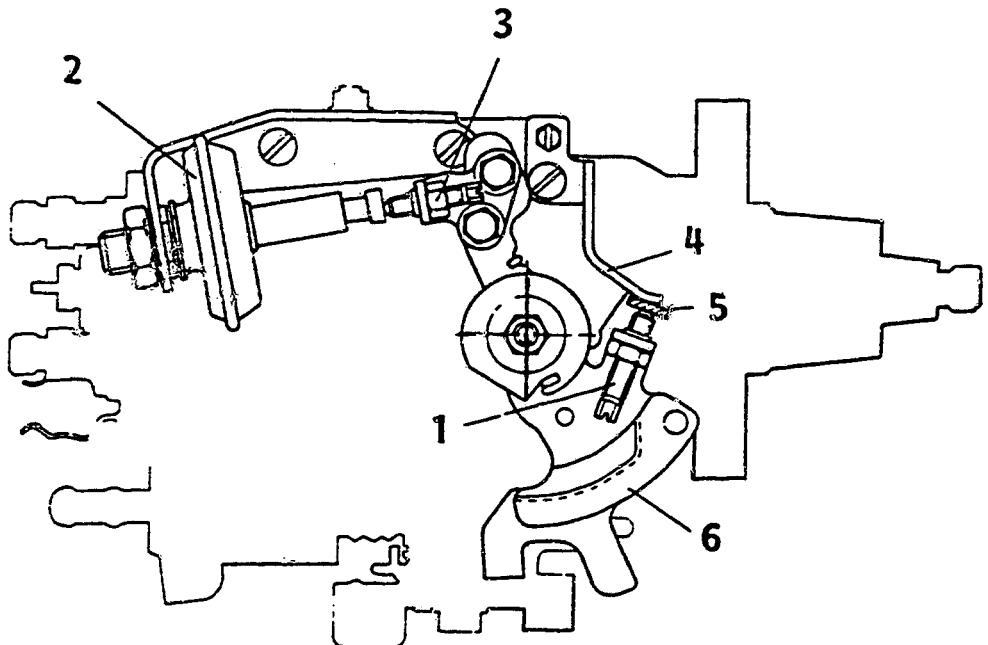


Figure 36

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1 = Idling stopper bolt  
 2 = Dash pot  
 3 = Dash pot adjusting screw

4 = Bracket  
 5 = Block gauge  
 6 = Control lever

#### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $3.8 \pm 0.05$  mm in the gap between the idling stopper bolt and the bracket.
2. With the control lever positioned as described in 1. above, adjust the dashpot adjusting screw so that the dashpot adjusting screw and the pushrod are in contact.  
Fix the screw using the nut.

